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Three Shillings

August 1960

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AN ILLUSTRATED MONTHLY JOURNAL

Edited by

P. A. D. Hollom E. M. Nicholson

I. J. Ferguson-Lees Stanley Cramp

Photographic Editor: Eric Hosking

Hon. Editors: W. B. Alexander N. F. Ticehurst

Editorial Address: 30 St. Leonard's Avenue, Bedford

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PLATE 45. Female Woodpigeon (*Columba palumbus*) about to brood nestling, her breast feathers raised ready to enclose it. Note the youngster's soft and spatulate bill, very different from that of the adult and specially adapted for thrusting into its parent's throat (page 324); the egg tooth is still on the tip (*photo: R. K. Murton*)

British Birds

VOL. 53 NO. 8
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Some photographs of Woodpigeon behaviour and feeding*

By R. K. Murton

Ministry of Agriculture, Fisheries and Food, Worplesdon, Surrey

(Plates 45-49)

UNTIL VERY RECENTLY little had been published about the behaviour patterns of the Woodpigeon (*Columba palumbus*). Then Cramp (1958) described the main features of territorial and nesting behaviour throughout the breeding season, as a result of a study of this species in the London parks and squares. Reference to his paper will give some indication of the context of the displays illustrated by the accompanying series of photographs; but it must be remembered that his observations refer to an urban population. There the breeding season—and consequently the incidence of territorial calling, nest building and other associated behaviour—is entirely different from a rural one.

It is important to realise that, although the basic behaviour patterns are relatively few in number, they can be combined in varying ways and at different intensities to produce the range of displays seen at different times in the breeding cycle. For instance, similar movements to the regurgitatory muscular contractions seen when a Woodpigeon feeds its young are employed during the billing ceremonies of the adults, although different functions are served. Until much more is known about the factors releasing a given response in a Woodpigeon,

*One of these photographs was originally selected for inclusion among the "examples of the best recent work by British bird-photographers" published in *British Birds* in May 1960 (53: 219-221 and plates 25-32). However, this very common but wary species is so difficult to photograph at the nest and there are so few studies of the pair together that we asked Mr. Murton to provide a series of his outstanding pictures with this explanatory text.—EDS.

care must be taken in interpreting any form of display in terms of a stage reached in the breeding cycle.

The notes which follow are intended to serve as a description of the plates, but the opinions expressed over certain aspects of behaviour are based on an extensive series of field observations.

A MEETING OF THE PAIR AT THE NEST

Plates 46 and 47 show what happened when a pair of Woodpigeons met at the nest. They depict a conflict of impulses between two birds which, had they not been united by overlaying emotional bonds, would have proceeded to fight. Similar displays can, and do, arise at other times in the breeding season, although not necessarily at such high intensity. For example, if a female is attracted by a nest-calling male (see Cramp) and the two birds come close to each other, then displays of this kind may occur. It would be wrong to consider these behaviour patterns as representing greeting or nest-relief ceremonies.

The following sequence of events led to the displays shown in the four photographs on plates 46 and 47. (When first found, this nest had contained the usual clutch of two, but soon after hatching one of the chicks had been discovered hanging from an adjacent thorn and quite dead.) At 1500 hours BST on 28th August 1959 I entered an observation hide erected about five feet from the nest. Fifteen minutes later a male Woodpigeon alighted near-by and started calling, continuing to do so at intervals for an hour and a quarter. He was then involved in a fight with a neighbouring male, after which he dropped to the ground, walked through the undergrowth surrounding the hide and flew up to the nest at 1710 hours. He fed the youngster and when the female appeared ten minutes later, at 1720 hours, it (the chick) was no longer begging for food. The female at first showed aggressiveness towards the male, a posture which Cramp (1958) described in full. In this the head is held erect, the feathers are sleeked and the wings are partially opened. (Plate 48a, although not representing fighting, gives some idea of this aggressive posture: in that case the male had just arrived at the nest after being involved in a territorial dispute with some neighbouring birds and aggressiveness was still apparent in his stance.)

Such a situation as there was when the female arrived at the nest can lead to fighting, the two birds lining up side by side and beginning to hit each other with their wings. In this case, however, the male immediately lowered his head and pushed it under the female's body (plate 46a). In this species, submission involves lowering the head, withdrawing the neck, pointing the bill downwards and fluffing out the feathers. All these actions are the opposite of the aggressive posture and serve to make the head and white neck mark inconspicuous.

The submissive posture can be seen, for example, when a nest-calling male wishes to attract a mate. There is every possibility that this head-hiding ceremony has evolved from the general submissive posture. Not only are the components which stimulate aggression lessened by the hiding of the head, but they are also completely removed from the second bird's vision. Goodwin (1960) attached the same interpretation.

When plate 46a was taken the female had already lost much of her aggressiveness, as is indicated by the withdrawn head and the fluffed feathers. In plate 46b the next stage is shown with the male beginning to assume a more upright posture and in plate 47a each bird has almost accepted the other's presence at the nest. The elements of aggression have now largely disappeared and the male is seen caressing the female by gently nibbling her plumage. Goodwin (1956) described caressing and considered its function at the physical level to be the removal of ectoparasites. He drew attention to the fact that 99% of it is done where the bird cannot reach with its own bill. Although this appears to be true, there is no *a priori* evidence that the two are connected. Many other species also have ectoparasites without having found it necessary to evolve such means of cleaning themselves. Goodwin also pointed out that there is an aggressive component in caressing and stated that all the evidence suggested that the caressing bird would become angry and show aggression if there were not a bond of affection between it and the other. This latter suggestion seems more significant and possibly gives the answer to this aspect of behaviour. It is well known that in Passerine species a form of submission shown by the female is a reversion to nestling behaviour with quivering wings and wide-open gape. Young pigeons are fed by regurgitation and so gaping would be a meaningless way of begging for food. Instead, the young pigeon pushes its bill or head into the adult's breast feathers and strokes its head upwards towards the adult's bill. This process is repeated and has a stimulating effect on the parent. I think that this behaviour may not be far removed from feather fondling which is primarily centred on the same areas. Caressing by adult pigeons could thus represent a reversion to juvenile behaviour which serves as a submissive posture and is a parallel to the gaping of adult Passerines. Billing, which Cramp (1958) also described, could be another aspect of such reversion to nestling behaviour and comparable with the presentation of food items which is well known in the courtship feeding of other groups of birds. Food appears to be passed during the process of billing, although it is difficult to be certain.

Reverting to the photographs, the next stage is shown in plate 47b. After caressing, both birds proceeded to nod. Nodding is found in a

variety of circumstances, many of which were admirably described by Goodwin (1956). He gave reasons for believing that nodding is derived from nest-building and that its occurrence in other circumstances represents a ritualised intention movement. He also allowed the possibility, however, that nodding represents an original movement found when the impulse to attack is inhibited by fear or sexual attraction—in other words, that it represents a displacement activity. I favour this second interpretation. During nodding one notices the tendency for an upright aggressive position to be followed immediately by a reversion to submissiveness. Often the two birds stand side-by-side and their nodding movements are out of phase. This was the case in plate 47b. On the occasion illustrated by these photographs the nodding display was followed by the female's leaving the nest without attending to the young. The nestling remained inactive throughout and did not present any obvious extra stimulus which would release other behaviour patterns.

THE FEEDING OF THE YOUNG

Plates 48 and 49 show the way in which nestling Woodpigeons are fed and the accompanying legends describe this process. Plate 45 illustrates the specially adapted spatulate bill. In a normal brood of two young it is usual for the nestlings to sit side by side facing the parent and for them both to insert their bills into the adult's gape at the same time. If a third nestling is artificially introduced into the brood, it is found that one chick has to wait until the other two are fed and satisfied before it can obtain any food. As a result, one youngster usually lags behind in weight and, if it survives, may spend an exceptionally long time in the nest and still be underweight on flying. Even if there were no other reason at all, it is clear that this would help to fix at two the number of eggs laid by pigeons.

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Autumn "drift-migration" on the English east coast

By David Lack

Edward Grey Institute, Oxford

INTRODUCTION

PARTICULARLY THROUGH the studies of Williamson (1952, 1955, etc.), the view is now widely accepted that the appearances of Continental night-migrants on the British east coast in autumn are much too infrequent and irregular to be explained in terms of a regular passage there, and instead they are attributed to "drift-migration" with easterly winds. In connection with my radar studies of migration in the North Sea off Norfolk in September, to be published later, I thought it important to understand the conditions under which such migrants occur at the coast. Previous workers have concentrated on relatively short periods of heavy passage, but I thought that a fuller picture might result from an analysis of the birds present every day throughout the autumn over a period of years.

For this purpose I studied the occurrence at the English east coast observatories of the warblers, flycatchers and chats (using the last term for all Turdinae except the genus *Turdus*). These species comprise a closely related group of small night-migrants which occur very irregularly on the east coast when travelling between their Continental breeding grounds and their winter quarters; the latter are chiefly in Africa, though some winter in southern Europe and a very few in Asia. Thrushes of the genus *Turdus* were excluded because, though some individuals are evidently "drift-migrants", there is also a regular broad-front passage over the North Sea from breeding grounds in Scandinavia to wintering grounds in Britain (Lack 1959a). Hence the addition of the thrushes would confuse the issue, and I thought it best to keep to a group of species which, except for a few British departures, are nowadays termed "drift-migrants" whenever they appear at the observatories in autumn.

ACKNOWLEDGEMENTS

The records from the Norfolk observatory at Cley were particularly relevant to the radar study, but in the early years were incomplete, so I also studied the fuller material from Gibraltar Point, Lincolnshire, and Spurn Point, Yorkshire, which are in the same general area. I am extremely grateful to the organisers, R. A. Richardson, R. K. Cornwallis and R. Chislett respectively, for generously placing their

records at my disposal and for their considerable trouble in compiling summaries and answering queries. In addition I would thank the great number of bird-watchers, here unnamed, whose enthusiastic holiday labours provided the raw data. The value of such records lies in their continuity, and at Spurn in particular hardly any days were missed in the eleven successive seasons analysed here, a tribute to the proverbial tenacity of Yorkshiremen. I am also grateful to M. T. Myres of the Edward Grey Institute for the radar observations between 30th September and 17th October 1959, though their interpretation in relation to "drift" is mine, not his. Finally I would thank W. R. P. Bourne, R. Chislett, R. K. Cornwallis, P. A. D. Hollom, R. E. Moreau, M. T. Myres, R. A. Richardson and K. Williamson for their considerable trouble in criticising earlier drafts of this paper; even when their criticisms were not accepted, they were of great value in the extensive rewritings which followed.

THE THEORY OF MIGRATIONAL DRIFT

In its modern form, the theory of "migrational drift" was formulated by Williamson in a series of papers (especially those of 1952 and 1955, but also others). This theory has been fully accepted by almost all workers on migration in Britain (though not abroad), and its acceptance, when not explicit, is implicit in nearly all publications from the British bird observatories. As it has been developed gradually, it is not stated in complete form in any one paper, so it is not easy to summarise, but the following is my impression of current belief on this subject among observatory workers, I hope a fair one:

The Scandinavian night-migrants making for Iberia and Africa depart in autumn chiefly in clear anticyclonic weather and keep over the land so far as possible. On reaching the southern end of Norway, they turn south-east along the coast, but are forced to cross the sea at the Skagerrak, after which, with many other such migrants from further east and north-east, they follow the coastal "leading-lines" southward down the eastern side of the North Sea. In the absence of easterly winds these birds do not enter Britain at all, but with such winds some of them are drifted westward over the North Sea and may reach any part of the British east coast, occasionally in large numbers. Basic to this view is the idea that the North Sea, which stretches for 400 miles between Norway and East Anglia, constitutes a dangerous hazard for small land-birds on migration, which they avoid crossing in so far as is possible.

As regards the nature of the drift with easterly winds, Williamson, arguing from his experience on Fair Isle, rejected Ritchie's view (1940) that a migrant's track over the sea is the resultant between an oriented heading and the wind; and both before, and especially since, Sauer's demonstration (1955) that certain warblers navigate by the stars, he associated drift-arrivals primarily with full overcast, when migrants cannot see to navigate by either coastal leading-lines or the stars. Williamson (see especially 1959, p. 363) further rejected Yapp's view (1956) that when migrants are disoriented in full overcast at sea they drift down-wind at the speed of the wind. Instead, he postulated that under these conditions the disoriented birds descend

low, assess the direction of the wind from their displacement relative to the waves, then re-orient themselves and fly down-wind until they reach land, where they alight. This habit Williamson regarded as an important adaptation for enabling migrants disoriented by fog at sea to regain the land as rapidly as possible. He also claimed that, through their restricted breeding range, the rarities among drift-arrivals might provide "markers" of where the drift started.

I recently advanced the following criticisms of these views (Lack 1959a):

(i) Evidence from other parts of the world indicates that small Passerine land-birds regularly migrate across at least 700 miles of sea, hence it need not be supposed on general grounds that the North Sea represents a significant hazard for small migrants.

(ii) The Passerine night-migrants detected by radar leaving eastern England in spring and autumn do not follow coast-lines, but travel on a broad front, putting out to sea when their heading lies that way and (unless disoriented) maintaining this heading at sea. (Coasting movements in this area have been detected by radar during the day in autumn, so are not necessarily below radar range.) In my view, the idea that Passerine night-migrants follow coastal "leading-lines" can be abandoned. As one consequence of this, it need not be supposed that the night-migrants leaving Norway in autumn turn south-east until they come to the Skagerrak; they may set out from southern Norway on a broad front. This view would mean that the Skagerrak is of no particular importance as an area where drift might start.

(iii) Radar has fully confirmed Ritchie's view that the normal track of a migrant over the sea, by day or night, is the resultant between its heading and the wind (Lack 1958). Further, the only movement of Passerine-type echoes detected by radar during the big "drift-arrivals" on the east coast from 2nd to 4th September 1958 was south-westward, and since the wind was south-easterly this was presumably a "laterally displaced" movement. Radar has also shown that migrants at sea in fog may be disoriented and, because the observatory workers have normally correlated drift-arrivals with full overcast, and because one would expect disoriented birds to be tired, I supported Yapp that the big falls of drifted migrants at the coast were probably due to "disoriented drift" (in which, as shown later, I was mistaken). I added that radar does not necessarily rule out Williamson's alternative view of drift as a "down-wind directed flight", since such birds, flying close to the waves, might be undetectable, but I made certain objections to this idea and held that such a habit would not, on balance, be adaptive.

(iv) I was sceptical of the value of rarities as "markers" and, since they appear at the observatories in disproportionately high numbers, supposed that there was something abnormal about their occurrence.

In his latest paper, Williamson (1959) replied to some of these criticisms and added important new facts and arguments, acceptance of which would seem basically to alter his earlier theory (though he did not himself say this). Thus he found the big arrivals from 2nd to 5th September 1958 extremely hard to understand because they occurred in clear weather, and he postulated that at least the eastern rarities involved began their down-wind drift several hundred miles inland. So in this instance down-wind flight, which he postulated to be an adaptation to bring migrants disoriented by fog at sea quickly back to land, apparently started far inland and continued in clear

weather over the sea. He did not discuss the radar evidence (Lack 1959ab) that the drift under discussion was laterally displaced and argued that, since the eastern rarities involved typically migrate south-east, they could not have reached England by either lateral displacement or disoriented drift. He then postulated that these rarities were not on migration but on a post-juvenile dispersal, which presumably differentiates them from the common migrants and removes their value as "markers" of the main drift.

Apart from Williamson's latest paper, "drift-migration" in the area reviewed here has been discussed by Jenkins (1953), Cornwallis (1954, 1955, 1956) and Chislett and Ainsworth (1958). Jenkins attributed the big arrival of Continental migrants on the English east coast on 1st and 2nd October 1951 to four factors: (i) an anticyclone in Scandinavia providing suitable conditions for departure after a long disturbed spell unsuitable for migration, (ii) fog in the sea-areas off Norway and Sweden disorienting the migrants, (iii) easterly winds then drifting them westward over the North Sea, and (iv) heavy overcast bringing them low, so that they alighted on reaching the English coast. He attributed drift to birds disoriented in full overcast being passively transported down-wind (later Yapp's view), whereas Cornwallis (like most other observatory workers) upheld Williamson's view of drift as an active re-oriented down-wind flight, and Chislett and Ainsworth supposed that it was "the unconscious drift westward of birds purposefully migrating south in autumn" (presumably Ritchie's view). Before continuing, the reader might like to make up his own mind as to which of these three interpretations might be correct.

THE PLACE OF ORIGIN OF THE MIGRANTS

The chief aim of this paper is to analyse the weather conditions in which Continental night-migrants do and do not occur on the English east coast, and it is therefore necessary to reach a provisional decision as to the area or areas from which these birds started. Jenkins (1953) assumed that on 1st and 2nd October 1951 the birds left southern Scandinavia, and this view is apparently the usual one. But if the birds migrated wholly down-wind across the North Sea, they presumably started from Scandinavia with a north-easterly wind, from Germany with an easterly wind and from Belgium (or further south-east) with a south-easterly wind. (I do not wish to imply that such a complex of down-wind origins for migrants reaching eastern England has been postulated by any observatory worker, but since this idea might be derivable from the "drift-theory" I thought it important to discuss the possibility at this stage.)

There are five reasons for thinking that, at least sometimes, the

Continental night-migrants in eastern England have not come down-wind. Firstly, they presumably did not do so during the big arrival of 2nd-4th September 1958 when there was a south-easterly wind and the only Passerine-type echoes detected by radar in the area moved, on average, somewhat west of south-west. I consider that these echoes came from the Continental Passerine migrants, since otherwise it is necessary to suppose both that the big arrivals at the coast were too low to be detected by radar and also that the big south-westward arrivals seen on radar were of other birds which left no visible trace at the coast. (In this period radar also detected westward movements of wader-type echoes, but no bird-echoes moving north-west and down-wind.) This was the third largest arrival in the eleven autumns studied here, but might have been unusual as it occurred in clear weather.

Secondly, the north Norfolk coast at Cley and Blakeney runs east and west, so is open to arrivals from the sea between slightly north of east and slightly north of west, but not to the south. On the supposition that "drift-migrants" over the sea normally alight on reaching the coast, those moving down-wind with a south-easterly wind in the southern North Sea would presumably land chiefly in east Suffolk and east Norfolk, and also beyond East Anglia's "drift-shadow" in east Yorkshire and further north. If any landed at Cley or Gibraltar Point, they would be individuals that continued migrating over East Anglia but dropped either on reaching the sea again in north Norfolk or after a brief further crossing at the mouth of the Wash; and one would expect the numbers doing this to be small compared with those alighting in east Norfolk and east Suffolk. This has not been the case. Nor with an ESE wind, which would place Spurn beyond the "drift-shadow", have there been much larger arrivals at Spurn than at Gibraltar Point or Cley. That, as shown later, most big arrivals at Cley and Gibraltar Point have occurred with south-easterly winds points strongly against the birds having come down-wind.

Thirdly, with easterly winds in the northern North Sea at night but a north-westerly wind in the southern North Sea next morning, there was a big arrival, including typical Continental species, at Gibraltar Point on 22nd August 1954, and moderate arrivals at Spurn on 30th September 1957 and 9th September 1958, the last also occurring at Cley (Gibraltar Point was not manned). If all these birds came off the sea, it could not have been down-wind, since there is land to the north-west of Spurn and Gibraltar Point. Again, there have been several moderate arrivals at the three observatories, sometimes simultaneously, with easterly winds in the northern North Sea but light south-westerly winds in the southern North Sea, as on 23rd September 1953, 20th

August and 24th September 1955, and probably 27th August 1949. These birds presumably came in off the sea against the wind, and were actually reported doing so at Cley on 24th September 1955 (*per* R. A. Richardson).

Fourthly, on the English east coast Pied Flycatchers are extremely common passage migrants, but Spotted Flycatchers are sparse. Yet both species breed abundantly in north-western Europe, both are conspicuous on migration, and both are common on autumn passage through the Iberian peninsula. Ringing recoveries show that the Pied Flycatcher is a pronounced south-westward migrant in autumn throughout its breeding range in western Europe. But, while the Spotted Flycatchers from north-western Germany and further south in western Europe migrate south-west, those from Sweden go south-east or south (Creutz 1941). The comparative paucity of Spotted Flycatchers among the migrants on the English east coast therefore suggests that these migrants have come primarily from Scandinavia, and not from further south in western Europe. Nor is there any suggestion that Spotted Flycatchers are proportionately much commoner on those arrivals with easterly or south-easterly winds than on those with north-easterly winds.

Fifthly, a critical test is provided by those species of chats and warblers which breed commonly in northern and western Germany, Holland, Belgium and northern France, but rarely in Scandinavia. If the Continental arrivals in eastern England come primarily from Scandinavia, these species should always be rare, but on a down-wind hypothesis they should be well represented in arrivals occurring with easterly or south-easterly winds. Two of the species concerned, the Marsh and Icterine Warblers, do not provide a fair test since they migrate south-east, but this does not apply to five others, namely the Stonechat, Black Redstart, Nightingale, Grasshopper and Reed Warblers. Table I shows clearly that all these species are sparse at the east coast observatories; further, some of those recorded there were probably departing British residents.

Perhaps none of these five arguments is by itself convincing, but together they constitute an extremely strong case. Moreover, the only apparent evidence to the contrary comes from the occasional occurrence of eastern rarities, which are not, in my view, reliable "markers" of where the main Continental arrivals originated and anyway do not point to a down-wind passage, as discussed later. I have therefore postulated that the main Continental migrants reaching eastern England have normally come from southern Scandinavia, and that this is the appropriate area in which to analyse weather conditions at the start of the night.

SPECIES AND TIMES SELECTED

All the species analysed in this paper, with their scientific names, are listed in Table I and the notes beneath it. As already mentioned, only chats, warblers and flycatchers have been considered. Nearly all of these pass through eastern England during September, with a few somewhat earlier or later, so the period analysed was from 20th August to 10th October inclusive. Two of the species included, the Robin and Goldcrest, differ from the rest in migrating chiefly in October, and some of the Goldcrests perhaps stay the winter, but otherwise both occur in similar circumstances to the rest, and I thought it best not to make any arbitrary exclusions from my selected group of birds. I used the Spurn and Gibraltar Point records for the eleven seasons 1949-1959 inclusive, during which a few days were missed at Spurn and rather more at Gibraltar Point (but at both observatories such days were clearly recorded). Only on 29th September 1951 were no observations made at either Spurn or Gibraltar Point, so the full record covers 571 days. Cley was less fully manned, but I was able to use the records for seven seasons, 1952 and 1954-1959 inclusive.

Except possibly for a few Whitethroats that bred at the observatories, all the birds counted and analysed in this paper were passage migrants, and most of them came from the east side of the North Sea. But some passages of Wheatears, Whinchats, Whitethroats and/or Willow Warblers, with occasional other British summer resident species, occurred in the absence of typical Continental migrants like the Pied Flycatcher, usually in disturbed westerly weather. These were probably departures from Britain (labelled "B" in Table II, as distinct from "C" movements which included typical Continental species).

For purposes of analysis, I reckoned the number of arrivals of each species each day at each observatory as the excess of that day's number over that of the previous day, or two days earlier, whichever was the greater. I allowed for the number two days earlier because skulking species are hard to count accurately. Hence when the recorded number for a species on one day was similar to that two days earlier but was smaller on the intervening day, this was more probably due to some being overlooked then than to a departure followed by an arrival. I would have made exceptions to this when such a change was observed simultaneously at two observatories or in several species, but this did not, in fact, occur. While this rule was needed to allow for observational omissions, some migrants undoubtedly leave on the day of their arrival and sometimes perhaps many do so; hence the totals reached by this means are certainly too small. It should be added that the numbers of certain numerous species at Cley in 1952, 1954 and 1955 were only estimated, so the figures for this observatory are rather less accurate than for the others.

ANNUAL TOTALS

The average number of arrivals of each species each autumn at each observatory is shown in Table I. The figures for Spurn are effectively complete, but a few days with big arrivals elsewhere were missed at Gibraltar Point or Cley. Further, some big and moderate movements at Spurn and Gibraltar Point, though not at Cley, almost certainly consisted of birds leaving Britain, and the averages after omitting obvious instances of this type are given on the right-hand side of the table. On 10th October 1959 some 4,000 Goldcrests arrived at Spurn, raising the annual average for this species from 44 to 410, an almost meaningless figure since it depends on one day and

TABLE I—AVERAGE NUMBER OF ARRIVALS OF EACH SPECIES OF MIGRANT EACH AUTUMN, 20TH AUGUST-10TH OCTOBER 1949-1959, AT THREE BIRD OBSERVATORIES ON THE EAST COAST OF ENGLAND

				Omitting movements of purely British origin	
	Spurn	Gibraltar Point (some days missing)	Cley (1952 and 1954-1959)	Spurn	Gibraltar Point
Wheatear (*Oenanthe oenanthe*)	110	93	107	93	48
Stonechat (*Saxicola torquata*)	6	+	2	6	+
Whinchat (*Saxicola rubetra*)	56	16	49	40	11
Redstart (*Phoenicurus phoenicurus*)	69	45	98	63	40
Bluethroat (*Cyanosylvia svecica*)	1	1	6	1	1
Robin (*Erithacus rubecula*)	78	41	11+	76	38
Sedge Warbler (*Acrocephalus schoenobaenus*)	10	4	3	6	2
Blackcap (*Sylvia atricapilla*)	5	3	4	5	3
Garden Warbler (*Sylvia borin*)	14	10	29	13	9
Whitethroat (*Sylvia communis*)	51	60	21	29	20
Lesser Whitethroat (*Sylvia curruca*)	3	6	6	3	4
Willow Warbler (*Phylloscopus trochilus*)	82	92	59	50	36
Chiffchaff (*Phylloscopus collybita*)	5	5	8	5	4
Goldcrest (*Regulus regulus*)	c410	36	22+	c410	34
Spotted Flycatcher (*Muscicapa striata*)	12	11	15	9	8
Pied Flycatcher (*Muscicapa hypoleuca*)	102	51	48	99	50
All species (including rarer birds below)	1,026	479	499	920	311

There were also between one and two per year per observatory of Black Redstart (*Phoenicurus ochruros*), Barred Warbler (*Sylvia nisoria*) (three per year at Cley) and Red-breasted Flycatcher (*Muscicapa parva*), and less than one per year per observatory of Nightingale (*Luscinia megarhynchos*) and the following warblers: Grasshopper (*Locustella naevia*), Reed (*Acrocephalus scirpaceus*), Aquatic (*Acrocephalus paludicola*), Melodious (*Hippolais polyglotta*), Icterine (*Hippolais icterina*), Subalpine (*Sylvia cantillans*), Greenish (*Phylloscopus trochiloides*), Wood (*Phylloscopus sibilatrix*), Arctic (*Phylloscopus borealis*) and Yellow-browed (*Phylloscopus inornatus*). The annual averages for Robin and Goldcrest are so greatly affected by huge arrivals on 1st-2nd October 1951 and 10th October 1959 respectively as to be almost meaningless. Movements at Cley are not considered to include any of purely British origin; hence this observatory's column may be looked at in relation to those on the right.

that the last in the whole series. (Gibraltar Point was not manned that day, and Cley reported "many".) The averages for the other common species were also much affected by a few big arrivals, notably of Robins on 1st and 2nd October 1951, so that none of the actual figures mean very much in themselves.

These totals suffice, however, to show that while "drift-migration" has attracted great attention in Britain, and is exciting because of the accompanying rarities, the numbers involved are utterly trivial by Continental standards. At Spurn between the dates specified, the average number of arrivals of all the species studied here was only 1,026 each autumn (twenty a day) and this is reduced to 920 each autumn if birds obviously leaving from Britain are omitted, and to 556 if the freak arrival of Goldcrests on 10th October 1959 is omitted. The corresponding averages for Gibraltar Point and Cley were rather smaller, but a few big arrivals were missed there. By way of comparison, my wife and I think that we probably saw more migrants of the same species round St. Jean de Luz in south-western France on 30th September and 1st October 1949 than were seen at any of the three observatories during the eleven autumns studied here; but we did not take counts and met an unusual situation, not appreciated at the time, since, after an anticyclone favouring migration over France, a depression moved in with much rain, doubtless precipitating the birds (*cf.* Lack 1953, p. 275). Again, Feeny (1959) reckoned that many more than 100,000 night-migrants were present on Heligoland on 14th September 1959, more than ten times as many as at one of the English observatories during the eleven autumns studied here!

Table I shows further that the annual average at one observatory exceeded 100 individuals for only three species, the Wheatear, Pied Flycatcher and Goldcrest (the last due entirely to one day's great fall). The average for the Robin at Cley would also have exceeded 100 if the autumn of 1951 (when counts were incomplete) had been included, since 2-3,000 Robins occurred there on 1st October that year. The other fairly numerous species were Whinchat, Redstart, Whitethroat and Willow Warbler. Since the period analysed covers the time of the main passage of nearly all the species concerned, the figures in Table I are effectively those for the whole autumn, except for the Robin and Goldcrest, of which fairly large numbers passed after 10th October in some but not other years.

The birds seen at the observatories were not, of course, all that entered eastern England on the days concerned. But even if migrants arrived at similar density along the whole east coast, the totals involved must have been very small by Continental standards. Further, it is likely that numbers are concentrated at the observatories, which are sited at places famous for migrants in the old collecting days. In

this connection I may add that, though I knew at the time that from 2nd to 4th September 1958 several hundred migrants arrived each day at Blakeney Point, I could find hardly any fifteen miles further east on the Norfolk coast, at Overstrand, and a watcher there could have had no idea that even a moderate arrival was taking place. The reasons for concentration at the observatories require further study. It might be primarily that they attract more of the birds passing overhead to alight there, but there is also the possibility of birds moving along the coast by day after their arrival and stopping in the isolated patches of cover at these headlands.

Table I confirms the well-known scarcity of the Lesser Whitethroat and Wood Warbler as passage birds, due to the fact that these two species migrate south-east and not south-west from northern Europe, the same holding to a lesser extent, as already mentioned, for the Spotted Flycatcher. On the other hand, as stressed by Williamson (1959), certain rare species such as the Barred Warbler and Red-breasted Flycatcher are, considering their normal range, unexpectedly regular. On 18th September 1959, for instance, in bushes behind the sand-dunes at Sea Palling in east Norfolk, M. T. Myres and I saw three Whinchats, two Redstarts, three Whitethroats, two *Phylloscopus,* one Pied Flycatcher and three Barred Warblers. Obviously these numbers were not proportional to the migration overhead, which would have meant that the Barred Warbler was one of the two commonest species travelling.

WEATHER FACTORS ANALYSED

For the start of migration, I analysed the weather situation each night in southern Scandinavia, using the map for midnight in the British Daily Weather Reports, the map for 1800 hours being rather too early in the evening at this time of the year. For the southern North Sea I used the map for 0600 hours, which is probably more relevant than that for midday, though some Continental arrivals started after noon and more continued then.

The general weather situation in southern Scandinavia was classified under one of three headings, "A" for settled anticyclonic weather, "D" for disturbed weather due to the vicinity of a depression or active front, and "T" for a situation changing from one to the other or when southern Scandinavia was about midway between centres of high and low pressure. This transitional category was used as little as possible.

The direction of the wind, at midnight in the north-eastern North Sea and at 0600 hours in the southern North Sea, was assumed to be parallel to the isobars, which is approximately true at 3,000 feet and over, where radar indicates that much, if not most, Passerine migration occurs (Lack 1960b). The same practice has become standard in American migration research (A. M. Bagg *in litt.*). The assessment from the isobars in the southern North Sea was checked by reference to the morning figures in the British Aerological Reports for the wind at 900 metres above Hemsby, Norfolk (or during 1949-1951 at 3,000 feet above Downham Market, Norfolk), and these latter figures were also used for the speed of the wind. Assessment of wind-directions from the isobars is difficult only with a centre of high

pressure or a front in the critical area. Surface winds were not analysed, firstly because they do not seem relevant to most nocturnal migration, secondly because the weather reports do not normally record them in the North Sea itself, and thirdly because the surface wind at stations bordering the North Sea is subject to purely local fluctuations, due to sea-breeze effects or in southern Norway to the influence of adjacent mountains.

It was hard to know the most satisfactory way to assess overcast. But, as birds are usually disoriented only in full overcast, I eventually noted "f" when fog or mist, "r" when rain and "+" when 8/8ths cloud were recorded on the weather maps, and otherwise left a blank. These symbols were used for the north-eastern North Sea when fog, rain or total cloud was recorded at any one of four stations, two in southern Norway and two in north-western Denmark, at either 1800 hours or midnight, and for the southern North Sea when fog, rain or total cloud was recorded at either of the stations in northern Holland, at Spurn or at Gorleston (on the east Norfolk-Suffolk boundary) at 0600 hours. Since fog, in particular, is often local or temporary, this usage almost certainly overweights the tendency for migrants to have met full overcast on the night or morning in question, but it was adopted as it seemed specially important to determine whether, and if so how often, arrivals might occur in the absence of full overcast.

As the migrants present were not in all cases counted exactly, I decided not to analyse them strictly numerically, but to group the arrivals in five categories, as follows: (i) "big", those which averaged 50 or more in a day at any two observatories combined; (ii) "moderate", those which averaged 20-49; (iii) "small", those which averaged 10-19; (iv) "very small", those in which 10-19 arrivals were recorded at one observatory but the average for any two observatories was less than 10; and (v) "negligible", those in which fewer still arrived (though not necessarily none). As already explained, all passages were further subdivided according to whether they included typical Continental species or only species which might have started from Britain.

To demonstrate my methods, I have set out in Table II the figures and weather data for all the big movements. I prepared similar tables for all other days, but, while the size of movement on each date is listed in Appendix A, the weather factors have not been set out there, since they can be obtained from the Daily Weather Reports. In any case, other workers might prefer to analyse different weather factors, for the available choice is great. It may be added, however, that should any reader have preferred to postulate a different area of origin for the migrants, the categories used here for both the general situation and the wind-direction in southern Scandinavia were so broad that they would often have held for other parts of north-western or western Europe. Again, should any reader have preferred to use the direction of the surface wind in the North Sea, inferred from the coastal stations, instead of the wind-direction at 3,000 feet inferred from the isobars, the differences involved would have been too small to affect appreciably the broad survey in Table III, though they might have somewhat modified the more detailed analyses in Table IV.

Finally, anyone who has tried to classify continuous variables into discrete categories will appreciate that border-line decisions have to be taken fairly often. I have done my best with these, but certain

TABLE II—THE BIG ARRIVALS (AT LEAST 100 BIRDS IN A DAY AT TW
AT THREE BIRD OBSERVATORIES ON THE EAST COAST O
20TH AUGUST-10TH OCTOBER 1949-1959

	Number of arrivals				*Weather in S Scandinavia at midnight*			
Date	Spurn	Gibraltar Point	Cley	Continental or British	General situation *Earlier*	*Midnight*	Full overcast	Wind direction
7.9.49	26	140	—	B	T	T		SW
9.10.49	67	42	—	C	(T)A	A	+	SE
28.8.50	50	50	—	B	D	T		SW
24.8.51	195	0	—	C	D	A		SE
31.8.51	156	4	—	B	D	T	+	SE
1.9.51	4	300	—	B	D	T	+	SE
1.10.51	337+	309+	*c*2,000	C	DT	A	+	SE
2.10.51	259+	many	many	C		A		E
10.9.52	70	56	*c*260	C	DT	A		NE
21.8.54	181	24	*c*260	C	DT	A	+	NE
22.8.54	12	112		C		A	+	E
31.8.54	51	88	0	B	D	D	+	NW
5.9.54	2	191	0	B	D	T	+	(NW)
25.8.56	41	62	5	B	T	D	+	SE
2.9.56	54	25	146	C	DT	A	+	(NE)
20.9.57	240	133+	251+	C	D	T	+	(NE)
21.9.57	217			C		A	+	SE
2.9.58	77	0	213	C	A	A	+	SE
3.9.58	132	129	287	C		A		SE
4.9.58	486	523	153	C		A		SE
5.9.58	202	1	25	C		A		SE
21.8.59	98	7	40+	C	A	A		SE
6.9.59	177	8	45	C	A	A	+	v
4.10.59	60	—	75	C	A(D)	A	+	SE
5.10.59	85	—	51	C		A	+	SE
10.10.59	*c*4,000	—	many	C	A	A		SE

weather situations and wind-directions were hard to allocate. However, while others might have allocated them differently, such borderline cases were not frequent enough to change the broad picture which it is the aim of this paper to present. I am also very conscious, as Williamson wrote to me (*in litt.*), that "there is a very great danger of over-simplifying an extremely complex situation in attempting to reduce these phenomena to a simple tabular statement", but unless such a summary is made it seems impossible to elucidate general trends.

THE BIG PASSAGES

Table II emphasises the small numbers involved. On only two days, 1st October 1951 and 10th October 1959, did an arrival exceed 1,000

STATIONS COMBINED)
ENGLAND

Weather in S North Sea at 0600 hours		
Full overcast	Wind direction	Wind-speed (knots)
	W	13
+	SE	11
	SW	08
	S	27
	SW	18
	W	15
(+pm)	E	29
+	E	18
	E	27
	ESE	08
+	NW	13
+	W	22
+	SW	25
+	W	21
+	ESE	24
	E	(0)
+	SSE	10
+	SE	14
	SE	21
	SE	16
	SE	16
	SE	14
	SE	11
	SE	23
	SE	20
+	SE	28

"C" means that typical Continental migrants were included, "B" that only British summer resident species were involved. "A" indicates settled weather, "T" transitional, "D" disturbed; the heading "Earlier" to the first of the two "General situation" columns refers to the previous five days. "+" means that full overcast was recorded by at least one station (a) round the Skagerrak at 1800 hours or at midnight, and (b) on the coast of north Holland or Norfolk or at Spurn, Yorkshire, at 0600 hours. Wind directions were assessed from isobars, but for the southern North Sea were checked by the aerological report for 0500-0900 hours from Hemsby in Norfolk (during 1949-1951 from Downham Market in the same county). On 1st October 1951 it was clear in the southern North Sea at 0600 hours, but there was total cloud after noon when the birds arrived.

birds, and on only one other occasion, 4th September 1958, did it exceed 300 in a day at one observatory. There were seven other days with an average Continental arrival of at least 100 birds, namely 2nd October 1951, 10th September 1952, 21st August 1954, 20th and 21st September 1957, and 2nd and 3rd September 1958. If, however, arrivals on consecutive days are treated as part of the same movement, the eleven autumns studied here included only six movements in which the number of Continental arrivals reached 100 per observatory per day, while in three autumns, those of 1950, 1953 and 1955, there was no Continental arrival that exceeded 50 birds in a day at one observatory.

Yet, though the "big" arrivals were rare and small, they included most of the migrants seen at the observatories in the period studied.

Thus the numbers at Spurn in the 26 days in Table II comprise nearly two-thirds of all those seen there during the eleven autumns, and their exclusion would have reduced the annual average for all species at Spurn from 1,026 to 373.

Table II also shows the marked difference in the weather situation for "C" movements, which included typical Continental species, and "B" movements, which did not; nearly all big "C" movements occurred in settled weather with easterly winds, and all big "B" movements in disturbed or transitional weather with westerly winds in at least part of the North Sea.

TYPES OF FACTOR INFLUENCING ARRIVALS

Three separate groups of factors might influence the arrival of Scandinavian night-migrants in eastern England, (a) those affecting the volume of departures from Scandinavia during the night, (b) those affecting the extent of drift off-course in the North Sea during the night and next morning, and (c) those affecting the proportion of arriving migrants actually alighting at the English east coast rather than passing inland.

Considering (a), more migrants leave Scandinavia at certain times of year than others, but this has effectively been allowed for by restricting the present analysis to the period from 20th August to 10th October. The other important factor under this head is the weather at night in southern Scandinavia. It is generally considered that more migrants set off in anticyclonic than in disturbed weather, and this presumably holds for the small Passerine night-migrants leaving Scandinavia in autumn, even though radar observations on the departures of the same and similar species from Norfolk in September suggest that the difference may be smaller than commonly believed. Since, however, the arrivals of Scandinavian night-migrants in eastern England are irregular and infrequent, it is evident that, though conditions must be suitable for migrants to leave Scandinavia during the night, other factors, presumably those under (b) and (c), are much more important in determining the numbers at the observatories next day. For this reason, such arrivals do not provide a good means for analysing which particular weather factors in Scandinavia most affect departures, and, beyond a general classification into anticyclonic, transitional and disturbed weather, the situation in Scandinavia has not been considered further here.

Considering (b), easterly winds in the North Sea may be expected to drift migrants towards England and westerly winds to drift them away from England. The drift is presumably greater with strong than light winds and also, if the observatory theory is right, much greater in full overcast than in clear weather.

Factors under (c) that might influence the proportion of arriving migrants actually alighting at the coast have as yet received little attention. Frontal rain is known to precipitate birds in other areas. Also, if migrants usually fly lower with head-winds, with strong winds or in full overcast, these factors might increase the proportion alighting at the coast. So might any factors increasing the time for which they have been air-borne, as they might then be more tired on arrival.

Some weather factors might well have an influence in more than one of these three connections. For example, light winds on the Norwegian coast might favour more departures from there but less extensive drift afterwards (and conversely for strong winds). Again, strong winds or full overcast in the southern North Sea might influence not only the extent of drift but the proportion of migrants alighting at the coast. In addition, the weather factors themselves are linked. An anti-cyclone in southern Scandinavia is normally associated with easterly winds in the North Sea; fog tends to occur with light not strong winds; fronts are normally associated with westerly not easterly winds; and so on. These possible inter-relationships must continually be kept in mind, and they greatly complicate the unravelling of the critical factors involved.

THE MAIN WEATHER SITUATIONS

It is first desirable to make a broad division of the main types of weather situation and the main wind-directions, as in Table III. Here all winds with an appreciable easterly component have been grouped under east, and all with an appreciable westerly component under west; further, the very few occasions with an easterly or westerly wind in the northern North Sea and a north or south wind in the southern North Sea were grouped under east or west winds respectively throughout. A separate category was, however, made for the occasions when the wind was light variable or light northerly in the northern North Sea.

Table III supports the accepted view that Continental night-migrants occur in eastern England primarily in settled weather with easterly winds in the North Sea, for 16 of the 19 big arrivals occurred in this type of weather, as did 14 of the 37 moderate arrivals. Further, from the other angle, big and moderate Continental arrivals did not normally occur in disturbed weather with westerly winds, and 43% of the days with a negligible Continental arrival (including here the days with purely British-type movements) had such disturbed westerly weather. It should be noted, however, that some types of weather situation occurred much more frequently than others. Hence the variations are best evaluated by comparing the figures in Table III across rather

TABLE III—INFLUENCE OF WEATHER SITUATION ON PASSAGE, BASED ON DATA FROM THREE BIRD OBSERVATORIES ON THE EAST COAST OF ENGLAND, 20TH AUGUST-10TH OCTOBER 1949-1959

Number of days in each category

	General situation	*Wind in North Sea* In N part midnight	In S part 0600 hours	Total number of days	Continental arrivals *Big*	*Moderate*	*Small*	*Very small*	British departures *Big*	*Moderate*	*Small*	*Very small*	Negligible passage
(i)	A	E	E	63	16	14	11	5	—	—	—	—	17
(ii)	A	N or v	E	22	1	3	5	2	—	—	—	1	10
(iii)	A	E	W	20	1	2	3	2	—	—	1	—	11
(iv)	A	W	E	29	—	2	5	2	—	—	1	1	18
(v)	A	W	W	20	—	—	—	—	—	—	—	—	20
(vi)	T	E	E	25	1	5	5	2	—	—	1	2	9
(vii)	T	v	E	2	—	1	—	—	—	—	—	—	1
(viii)	T	E	W	16	—	1	1	1	2	—	1	—	10
(ix)	T	W	E	11	—	—	1	2	—	—	—	—	8
(x)	T	W	W	77	—	2	1	2	3	1	3	1	64
(xi)	D	E	E	6	—	1	—	1	—	—	—	—	4
(xii)	D	E	W	58	—	3	2	1	1	4	3	5	39
(xiii)	D	W	E	4	—	—	—	1	—	—	—	1	2
(xiv)	D	W	W	218	—	3	10	15	1	10	14	12	153

The lower limit of mean size for big movements was 50, for moderate 20, for small 10, and for very small less than 10 though at least this number at one observatory. "A" indicates settled weather, "T" transitional, "D" disturbed. The wind was classified as "E" if it had any appreciable easterly element and "W" if it had any appreciable westerly, "v" when light and variable.

than down, *i.e.* by comparing the size of arrivals in each type of weather rather than the frequency of the different types of weather associated with each size of arrival.

INFLUENCE OF GENERAL WEATHER SITUATION IN SCANDINAVIA

As already mentioned, settled weather in Scandinavia is usually associated with easterly winds. Hence to assess the influence of the weather situation apart from the wind, it is best to consider only those days on which easterlies prevailed throughout the North Sea. Using these exclusively, Table III shows that big arrivals occurred on a quarter of such days in anticyclonic weather, but on only one of 25 in transitional weather, and on none of six in disturbed weather. Again, the proportion of such days with negligible Continental arrivals was a little over a quarter in settled weather, about a half in transitional, and two-thirds in disturbed.

Similarly, if the days with an easterly wind in only part of the North Sea are compared, big, moderate or small Continental arrivals occurred on 28 out of 71 in settled weather, but on only seven out of 29 in transitional and on only seven out of 62 in disturbed.

Hence with similar wind-directions in the North Sea, the number of Continental arrivals was greatest when the weather in southern Scandinavia was anticyclonic, smaller when it was transitional, and least when it was disturbed. This fits the view that departures are favoured by anticyclonic weather, but this conclusion cannot be accepted with certainty until the possible influence of other, and perhaps associated, weather factors has been excluded. It should also be added that arrivals were not restricted to anticyclonic conditions, since one big and nine moderate ones occurred with transitional weather in southern Scandinavia and seven moderate ones with disturbed weather there; and at least most of these were probably genuine departures from Scandinavia, not redetermined movements from England (discussed later).

INFLUENCE OF PREVIOUS WEATHER SITUATION

Earlier workers have, in general, supposed that especially large migratory movements occur on the first fine day after a disturbed spell and, as already mentioned, Jenkins (1953) attributed the big arrivals of 1st and 2nd October 1951 to this cause. I tested this point for all the big Continental arrivals in Table II, where the column headed "General situation earlier" refers to the five nights before that of departure. This shows that only nine of the big Continental arrivals were preceded by a disturbed spell, the other ten following a period of anticyclonic weather. Likewise, if arrivals on consecutive days are treated as part of the same movement, only six big movements

were preceded by disturbed weather and the other six by anticyclonic, the latter including two of the three biggest ones (during 2nd-5th September 1958 and on 10th October 1959). Similarly, of the 21 moderate arrivals in settled weather, nine were preceded by an anticyclonic spell, seven by mixed or transitional conditions, and only five by disturbed.

This point is best tested for the 63 days with settled weather and easterly winds throughout the North Sea (as this reduces the other variables that might be involved). In this type of weather there were big and moderate arrivals on 30 days, of which 15 were preceded by anticyclonic conditions, three by mixed and twelve by disturbed. But of all the 63 days with this type of weather, rather more were preceded by a settled spell than by a disturbed one (in the proportion of five by settled, one by mixed and three by disturbed weather). Hence big and moderate arrivals were, proportionately, a little more likely on the first day of settled weather after a disturbed spell than on a day of settled weather preceded by several similar days. But the difference was very small and is probably attributable to another factor, since light winds (which are characteristic of a spell of anticyclonic weather) militate against big arrivals, as shown later.

I conclude that, with settled weather in Scandinavia in autumn, any presumptive hold-up of departures due to previous bad conditions had no appreciable influence on the number of Continental migrants reaching eastern England. Similarly, radar evidence suggested that emigration from Norfolk in spring was not unusually large on the first fine night after a disturbed spell (Lack 1960a).

BROAD INFLUENCE OF WIND-DIRECTION

The influence of the wind-direction is best seen by considering each type of weather situation separately. Table III shows that, in settled weather, big and moderate Continental arrivals occurred on nearly half the days with easterly winds throughout the North Sea, but on only nine of the 71 days with easterly winds in only part of the North Sea, and on none of the 20 days with westerly winds throughout the North Sea. Similarly in transitional weather, big and moderate arrivals occurred on six of the 25 days with easterly winds throughout, on only two of the 29 days with easterly winds in only part, and on only two of the 77 days with westerly winds throughout. Hence easterly winds were favourable and westerly winds unfavourable for these arrivals, so at first sight the term "drift" seems fully justified, but the possible influence of other associated weather factors must again be kept in mind and in particular, as shown later, the strength of the wind. It should be repeated that a few arrivals occurred with westerly winds throughout the North Sea.

BRITISH DEPARTURES

Table III shows that there were seven big, 15 moderate, 24 small and 23 very small passages which did not include any typical Continental

migrants such as the Pied Flycatcher, and that nearly all of these, including all the big and moderate ones, occurred with disturbed or transitional weather in southern Scandinavia and with westerly winds in at least the southern North Sea. Indeed, the only exceptions were four small or very small movements in settled weather, and four others in transitional weather, with easterly winds in at least part of the North Sea, all of which might have been true Continental arrivals in which, by chance, no typical Continental species were noticed.

"British-type" movements were fairly frequent at Spurn and Gibraltar Point, sometimes but by no means always on the same day, but, of the 69 such movements involving at least ten individuals at one of these two observatories, only two small ones occurred at Cley (and one of those was in settled weather with an easterly wind, so was probably a true Continental arrival). This fits well with the view that the birds involved were departing British summer residents. For radar has shown that the main direction of migration over eastern England at night in September is SSE, and one might therefore expect that migrants travelling over the land in this direction would sometimes be held up at Spurn or Gibraltar Point, which have sea to the south and east of them, but not at Cley and Blakeney, which have sea only to the north. Radar has also shown, however, that such nocturnal departures over the land in September occur primarily in settled cold weather with northerly winds, and not in disturbed and warm south-westerly conditions. Hence these passages at Spurn and Gibraltar Point were evidently not part of the main migration of the species. Perhaps they consisted of night-migrants continuing SSE by day in rather unsuitable weather, turning south on reaching the east coast and then being checked on arriving at a headland with sea to the south. In at least two instances, as shown later, such movements were restricted to the early morning. Further study of this type of passage is needed.

SETTLED WEATHER WITH EASTERLY WINDS THROUGHOUT NORTH SEA

Though most big and many moderate Continental arrivals occurred in anticyclonic weather with easterly winds throughout the North Sea, so also did eleven small, five very small and 17 negligible ones, so this type of weather requires further analysis. The influence of the wind is examined further in Table IV, and the influence of overcast in Table V; while, in addition, Mr. J. F. Scott of the Oxford University Unit of Biometry kindly carried out statistical tests using not the categories in Table IV but the average number of arrivals per observatory on each day. With this latter method, however, it is hard to know how much weight to attach to the very few extremely big arrivals, which on an arithmetical scale dominate the results. On either method

TABLE IV—INFLUENCE OF WIND ON CONTINENTAL ARRIVALS IN SETTLED WEATHER WITH EASTERLIES THROUGHOUT THE NORTH SEA, BASED ON DATA FROM THREE BIRD OBSERVATORIES ON THE EAST COAST OF ENGLAND, 20TH AUGUST-10TH OCTOBER 1949-1959

	Number of days with arrivals of each size			
	Big	Moderate	Small and very small	Negligible
Wind in north-eastern North Sea at midnight				
NE	3	3	3	5
E	1	0	4	5
SE	12	11	9	7
Wind in southern North Sea at 0600 hours				
NE	0	5	4	5
E	3	2	1	4
SE	12	3	7	6
SSE(S)	1	4	4	2
Mean speed of winds between E and S in early morning at 900 metres above Norfolk	19 knots	20 knots	9 knots	11 knots

This table analyses all 63 days in the first line of figures in Table III. The wind was classified as SSE(S) in the southern North Sea on the days when the isobars indicated that it was south-easterly there, while the aerological reports showed that it was from 170° to 180° (rarely just west of south) over Norfolk. The mean speed for NE winds in the southern North Sea was 8 knots for moderate arrivals, 10 knots for small and very small ones, and 14 knots for negligible ones.

the only factor with a statistically significant influence was the speed of the wind in the southern North Sea.

Wind-direction

Table IV suggests that a SE wind is more favourable for arrivals than a wind between E and NE. Thus big and moderate arrivals were proportionately twice as frequent with a SE wind in the north-eastern North Sea as with an E or NE wind there (23 out of 39, or 59%, compared with seven out of 24, or 29%). A similar relationship held for big, but not for moderate, arrivals with a SE wind in the southern North Sea. Further, of the three big arrivals with a NE wind in the north-eastern North Sea, two occurred with a SE wind further south and the other with a strong E wind further south: hence no big arrival took place with a NE wind throughout the North Sea. Further, only two of the 14 moderate arrivals occurred with a NE wind throughout the North Sea (the three others with a NE wind in the south took place with a SE wind in the north, and the other with a NE wind in the north occurred with a strong E wind in the south). On the other hand, the wind was north of E throughout the North Sea for five negligible arrivals and E throughout the North Sea for two more.

PLATE 46. Woodpigeons (*Columba palumbus*) meeting at the nest, a conflict of impulses. Above, the male is hiding his head beneath the female's body, following aggressive behaviour on her part (page 322); the way she is erecting her feathers indicates that this is now lessening. Below, her aggression has abated (shown by the lowering of the head) and the male is beginning to stand upright again. His position here is identical with that in nest-calling (page 322) (*photos: R. K. Murton*)

PLATE 47. Woodpigeons (*Columba palumbus*) meeting at the nest, the next stage. Above, the male is caressing the female by gently nibbling her plumage (page 323); aggression has now disappeared and the two birds have accepted each other's presence. Below, nodding display as the pigeons stand side by side (pages 323-4); the female (still on the right) has partially raised her wings, an action associated with fighting, while the male is holding his close to his body (*photos: R. K. Murton*)

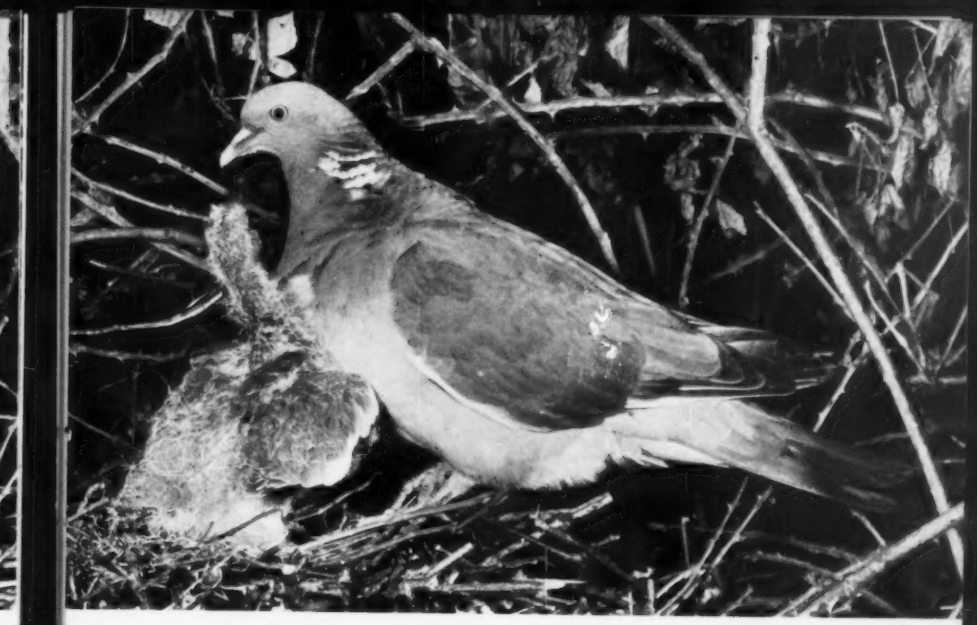
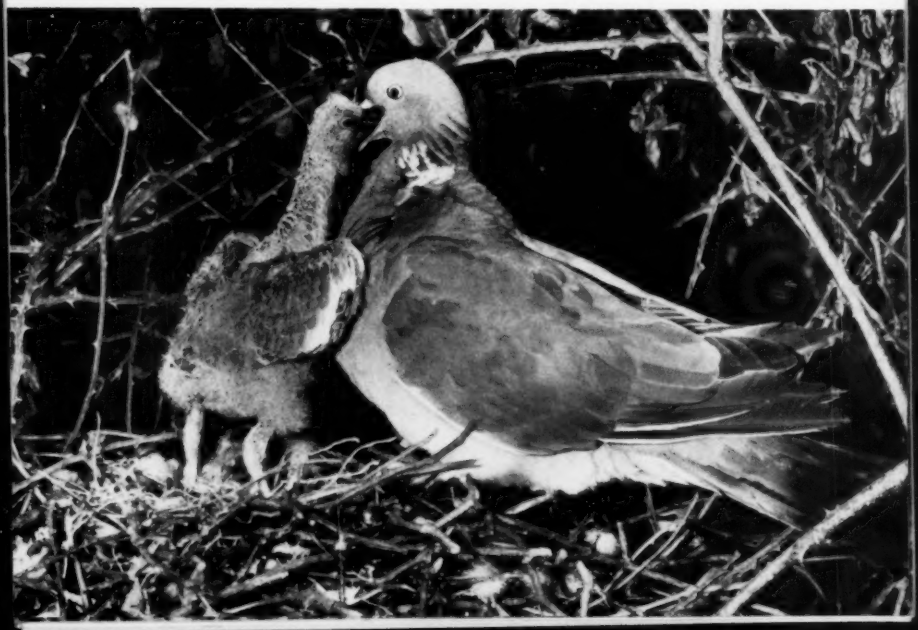


PLATE 48. Male Woodpigeon (*Columba palumbus*) arriving at nest to feed young. Above, the nestling is begging for food while its parent is in a partially aggressive posture, having just been involved in a territorial dispute with a neighbouring pair (page 322). Below, the male lowers his head so that the nestling can insert its bill into his gape to receive the food. In a normal brood of two, both youngsters thrust their bills into the adult's throat at the same time (page 324) (*photos: R. K. Murton*)

PLATE 49. Female Woodpigeon (*Columba palumbus*) pumping food from her crop into the youngster's specially adapted spatulate bill which is thrust up her throat. She jerks her head up and down to assist the passage of the food and the nestling does so in accompaniment, the extremes of the action being shown in these two photographs. Muscular contractions cause the old bird's neck feathers to stand upright. The feeding nestling normally keeps its eyes closed (*photos: R. K. Murton*)



Wind-speed

Hence arrivals in eastern England are probably (though not certainly) favoured by cross-winds from the SE as distinct from following winds from the NE. But, since the wind was SE throughout the North Sea for six negligible and seven small or very small arrivals, a SE wind in itself does not necessarily result in a big arrival. One critical factor is evidently the speed of the cross-wind in the southern North Sea. Thus for E, SE and SSE cross-winds, the average speed at 900 metres above the east Norfolk coast was 19-20 knots on the mornings with big and moderate arrivals, but only 9-11 knots on those with small or negligible ones, and the difference was statistically significant. A strong cross-wind presumably causes more extensive drift, and it might also cause the migrants to fly lower, so that more of them tend to alight on reaching the coast. The last part of the note under Table IV shows that a similar relationship with wind-speed did not hold for NE winds, as might be expected since these are tail-winds.

Figures for the upper winds in the north-eastern North Sea are not published in the British weather reports, but those for the surface wind in southern Scandinavia suggest that arrivals in England are favoured by light not strong winds there, presumably because migrants set out from southern Scandinavia chiefly with light ones. Thus for no big arrival did the surface wind exceed 15 knots in southern Scandinavia on the previous night.

As already mentioned, seven small and six negligible arrivals occurred with a SE wind throughout the North Sea, but on most of these occasions the wind was light in the southern North Sea and on the rest it was strong (20-25 knots) in south Norway: these two factors between them might be enough to explain the paucity of arrivals on these 13 days.

Overcast

All previous workers on drift have stressed the importance of overcast, except in the case of the big arrivals from 2nd to 5th September 1958. As already mentioned, however, it is hard to know how to assess it, and the method used probably exaggerates its frequency while leaving the possibility that migrants sometimes met overcast in part of the North Sea when it was unrecorded at the coastal stations. But if, as may be presumed, overcast at the coastal stations is correlated with overcast in the adjacent North Sea, then this method should reveal general trends.

Table V shows that, of the twelve nights on which fog was recorded round the north-eastern North Sea, three-quarters were followed by a big or moderate arrival in eastern England. Hence fog in this area possibly had some influence, but it was at most very subsidiary, since three-quarters of the big and moderate arrivals occurred when fog was not recorded there (and these included the three largest ones of all). Also, in the period studied, fog was twice as frequent with SE winds, which apparently favoured arrivals, as with E and NE, which did not, so at least part of its apparent influence might be attributable to the wind-direction. Total (8/8ths) cloud in the north-eastern North Sea evidently had no influence, being as frequent for big and moderate arrivals on the one hand as for small and negligible ones on the other. Half the big arrivals, including the biggest of all, occurred when neither fog nor total cloud was recorded round the north-eastern North Sea.

Round the southern North Sea, Table V shows that fog and total cloud were actually less frequent with big and moderate arrivals than with small and negligible ones; and half the big and moderate arrivals occurred on mornings when neither fog nor total cloud was recorded there. This strongly suggests that overcast in this area had no influence. But this is not certain, since, as shown in Table II, one of the two arrivals involving at least a thousand birds was associated with fog

TABLE V—INFLUENCE OF FOG AND CLOUD ON CONTINENTAL ARRIVALS IN SETTLED WEATHER WITH EASTERLY WINDS THROUGHOUT THE NORTH SEA, BASED ON DATA FROM THREE BIRD OBSERVATORIES ON THE EAST COAST OF ENGLAND, 20TH AUGUST-10TH OCTOBER 1949-1959

	Number of days with arrivals of each size			
	Big	Moderate	Small and very small	Negligible
Situation in north-eastern North Sea at 1800 hours or midnight				
Fog in places	3½	4½	0½	2
8/8 cloud in places	4½	5½	8½	2
Clear or partly clear	8	4	7	13
Situation in southern North Sea at 0600 hours				
Fog in places	2½	3	4	5
8/8 cloud in places	4½	5	9	4
Clear or partly clear	9	6	3	8
Frontal rain	2	2	—	—

Fog or mist prevents examination of the cloud cover; therefore, when both fog and 8/8 cloud were recorded on the same occasion at different stations in the same area, each was scored as "½". The big movement on 1st October 1951 was classified as occurring with total cloud because there was total cloud after noon when the migrants arrived.

and the other with total cloud in the southern North Sea; it is hard to know how much weight to attach to this.

Frontal rain

Frontal rain was recorded on the English east coast on four of the 63 days analysed in this section, occurring on 2nd September 1956 and 21st September 1957 with big arrivals and on two other days with moderate ones. Since it is well established elsewhere that frontal rain may precipitate passing migrants, it presumably was a factor on the four occasions mentioned, but its overall influence was unimportant owing to its rarity in eastern England in the settled type of weather analysed here.

Conclusion

Although big and moderate arrivals were commonest with settled conditions and easterly winds throughout the North Sea, they occurred on slightly under half of the days with this type of weather. Nearly all big and most moderate arrivals took place with SE winds in at least part of the North Sea, and not with following NE winds; but the only variable with a significant positive influence on the number of arrivals in this type of weather was a strong cross-wind (between E

and SSE) in the southern North Sea. Fog in the north-eastern North Sea and fog or total cloud in the southern North Sea conceivably had some influence, but if so it was very subsidiary and many big and moderate arrivals occurred in their absence. Frontal rain on the English east coast very possibly had an influence when present, but it was rarely present.

ARRIVALS IN OTHER TYPES OF WEATHER

In Table III the weather was divided into 14 types, but in all of these except the first, treated in the previous section, big and moderate arrivals were too sparse to establish correlations with particular weather factors. Further, the figures for diverse types of weather cannot validly be grouped together for statistical comparisons. It is, however, important to appreciate that sizeable arrivals were by no means confined to settled weather with easterly winds. Hence those in other types of weather have been summarised in Appendix B, while points of special interest are discussed in the present section (in which roman numerals in brackets at the end of a sentence mean that further details can be found under that type of weather in Appendix B).

As shown by Table III and Appendix B, anticyclonic weather with easterly winds (type i) was much more favourable for arrivals than any of the other types of anticyclonic weather (ii-v). I at first ascribed this to the paramount importance of westward drift by easterly winds throughout the North Sea. However, while this presumably played a part, the details in Appendix B, together with the findings for wind-strength in the previous section and the radar evidence discussed later, strongly suggest that the biggest factor militating against large arrivals in the other types of anticyclonic weather was the accompanying very light wind in the southern North Sea (ii, iv, v); and that, under these conditions, migrants arrived in eastern England but did not alight in appreciable numbers at the coast. This explanation is tentative. Incidentally, it might explain why, with westerly winds throughout the North Sea, there were only negligible arrivals in calm anticyclonic weather (v), but at least two moderate and many small arrivals in windier transitional or disturbed weather (x, xiv).

As shown in Table II, there were only three big arrivals in other types of weather. One was in anticyclonic conditions with a light variable wind in the northern North Sea and an 11-knot south-easterly further south, so that the extent of westward drift was presumably small. Another was in anticyclonic weather with an easterly wind in the northern North Sea and a north-westerly further south, so that westward drift was presumably restricted to the first part of the night. (This might be classified as an instance of "cyclonic approach", discussed later.) The third was in transitional weather with extremely

light easterly winds throughout the North Sea, so that westward drift was presumably negligible; it occurred on the first day of improving weather after an unusually long disturbed spell.

TABLE VI—CONTINENTAL ARRIVALS IN OTHER KINDS OF SETTLED AND FAIRLY SETTLED WEATHER (TYPES ii-vii IN TABLE III), BASED ON DATA FROM THREE BIRD OBSERVATORIES ON THE EAST COAST OF ENGLAND, 20TH AUGUST-10TH OCTOBER 1949-1959

	Number of days with arrivals of each type		
	Big and moderate	Small and very small	Negligible
Conditions in north-eastern North Sea at midnight			
Wind			
NE and E	4	5	9
SE and S	5	7	14
SW and W	—	1	9
NW and N	3	10	32
Light variable	4	3	5
Overcast			
Fog in places	2	4	10
Rain in places	—	1	2
8/8 cloud in places	10	10	28
None of these	4	11	29
Conditions in southern North Sea at 0600 hours			
Wind			
NE and E	4	12	22
SE and S	9	9	20
SW and W	2	5	13
NW and N	1	—	7
Light variable	—	—	7
Overcast			
Fog in places	3	9½	9
Rain in places	—	2½	7½
8/8 cloud in places	6	4	20½
None of these	7	10	32
Mean speed in knots of winds between E and SSE 900 metres above Norfolk	9 knots	14 knots	12 knots

As in Table V, when any two of fog, rain and 8/8 cloud were recorded on the same occasion at different stations in the same area, each was scored as "½". The total numbers of days on which the mean wind-speeds in this table are based are 11, 13 and 22 respectively (reading from left to right). This table should not be used for statistical comparisons, since diverse types of weather are grouped together.

For an overall conspectus, I have summarised in Table VI the arrivals in the other types of settled and fairly settled weather (*i.e.* in all other anticyclonic weather together with transitional weather with easterly winds, types ii-vii in Table III); but I would stress that comparisons based on the grouping of different types of weather must be highly tentative. As regards the wind in the north-eastern North Sea, the most suggestive point in Table VI is that there were negligible arrivals on nine of the ten nights with a west or south-west wind, and only a very small one on the other. This was probably because, though the weather was anticyclonic, migrants rarely set out from Scandinavia in autumn on warm nights (*cf.* Lack 1960c). The proportion of moderate arrivals with north-westerly winds was also very small, although as this is a cold direction many migrants probably left Scandinavia on such nights; the paucity of arrivals then was probably due mainly to the accompanying light winds in the southern North Sea, and on some occasions to eastward drift away from England (iv, v).

In the southern North Sea, big and moderate arrivals were slightly more than twice as frequent with south-easterly as north-easterly winds, supporting the trend found in settled easterly (type i) weather; there was also a big arrival with a north-westerly wind (already mentioned) and two moderate ones with an extremely light south-westerly, all with easterlies further north.

For the eleven big and moderate arrivals treated in Table VI in which the wind was between east and SSE in the southern North Sea, its mean speed above Norfolk was only 9 knots. Thus the correlation between big arrivals and strong winds found in settled easterly conditions was definitely absent in these other types of weather (though it was present for the big arrivals in late October summarised in Table VII). This presumably means that strong south-easterly winds are only one of the possible factors producing big arrivals, but what alternative factors might have been involved on the eleven days now under discussion is far from obvious.

As regards overcast in the north-eastern North Sea, no appreciable variations were found with fog; and, though the proportion of big and moderate arrivals was about twice as high on the nights with total cloud as on those without it, this is of doubtful importance. In the southern North Sea, fog again appeared to have no influence, while big and moderate arrivals were rather commoner with than without total cloud. As in settled easterly weather, quite a number of big and moderate arrivals occurred in the absence of full overcast.

The most striking point about the 16 days with big and moderate arrivals in Table VI is that they shared no weather factor in common, and that there seemed nothing distinctive about them. The same held for the moderate arrivals in more disturbed weather. It is likely that

two of the ten moderate arrivals listed in Table III for weather of types viii-xiv were really redetermined departures from England (see x, xiv), but the other eight were evidently from the Continent. One of them occurred in transitional weather with a south-easterly wind in the northern North Sea and a very light south-westerly in the southern North Sea (like two moderate arrivals in anticylonic weather); and a second took place with similar wind-directions but more disturbed weather. Three more occurred in circumstances in which westward drift can be excluded, one in transitional weather with a light north-westerly throughout the North Sea and the others in disturbed conditions with a westerly or south-westerly throughout. The last three of the eight took place in what observatory workers have termed "cyclonic approach"—when a depression moves east across the North Sea during the night with an easterly wind to the north of it, and a north-westerly wind behind it next morning. The implication has been that, under these conditions, migrants reach England by flying down-wind round the depression, but the radar evidence cited later for a moderate arrival of this type on 8th September 1958 points strongly against this interpretation. (The 27 days with weather of this type are summarised under xii.)

Finally, in disturbed weather with westerly winds throughout the North Sea, there were not only two moderate arrivals, as already mentioned, but 25 small or very small ones that included typical Continental species. Most of the latter presumably came from the Continent on the preceding night, though a few might have been redetermined departures from England. In particular, disturbed weather with westerly winds prevailed from 20th August to 19th September 1957, and during this time there were no big or moderate Continental arrivals and no easterly winds. But between 29th August and 17th September there were seven small or very small arrivals that included such characteristic Continental migrants as Robins, Redstarts, Garden Warblers, Goldcrests and Pied Flycatchers, also a Red-breasted Flycatcher on 29th August and Barred Warblers on 8th and 13th September; since redetermined movements can be virtually excluded in this period, these birds presumably came from the Continent with westerly winds. Disturbed westerly weather is the commonest type in the North Sea in autumn and small Continental arrivals occurred on only about a tenth of the days concerned, but it is interesting that any at all should occur under such conditions.

ARRIVALS IN LATE OCTOBER

Because only Spurn was regularly manned after 10th October each year, I did not analyse what happened every day after that date, but considered only the big and moderate arrivals (predominantly of

TABLE VII—BIG AND MODERATE ARRIVALS OF GOLDCRESTS (*Regulus regulus*) AND ROBINS (*Erithacus rubecula*) AT SPURN POINT, YORKSHIRE, LATE OCTOBER 1948-1959

	Number of days with arrivals of each type			
	North-eastern North Sea		Southern North Sea	
	Big	*Moderate*	*Big*	*Moderate*
Wind-direction				
NE	1	1	1	1
E	1	3	1	2
SE	2	3	3	3
S	1	—	—	—
W	—	—	—	1
Overcast				
Fog in places	—	—	—	—
8/8 cloud in places	1	5	1	7
Frontal rain	—	—	1	—
None of these	4	2	3	—

This table is based on big arrivals on 9th and 30th October in 1948, on 23rd in 1950, on 12th in 1951 and on 23rd in 1955; and on moderate arrivals on 29th October in 1948, on 30th in 1949, on 25th in 1950, on 27th in 1951, on 19th in 1952, on 15th in 1953 and on 16th in 1956. On the one occasion with a wind near to south in the northern North Sea it was probably somewhat east of south. The mean speed for all winds between east and south above Norfolk was 20 knots. A moderately large arrival of Goldcrests on 17th October 1959 was omitted as it was probably a redetermined movement; it occurred only a week after a huge arrival of the same species, on a day when there was a 30-knot SSW wind above Hemsby and when radar showed no movements out to sea.

Goldcrests and Robins) at that one observatory during the rest of October. Including some figures for 1948, this provided five more big arrivals and seven more moderate ones, on the dates listed in the notes beneath Table VII. All twelve arrivals occurred in anticyclonic weather in southern Scandinavia, like almost all the big ones in Table II. Further, only three big and one moderate arrival were preceded by a spell of anticyclonic weather, one big and one moderate by disturbed weather, and the rest by mixed weather (in four of which the two immediately preceding days were anticyclonic); hence, as found earlier, the big arrivals were not correlated with a previous hold-up due to bad weather in Scandinavia.

The direction of the wind and the occurrence of overcast during these movements have been summarised in Table VII. The wind was south-easterly in at least part of the North Sea for nine of the twelve, as it was for nearly all the big and moderate arrivals in Table IV.

For one moderate arrival the wind was easterly throughout the North Sea, for another it was north-easterly throughout, and for a third it was south-easterly in the northern North Sea but light south-westerly in the southern part; for all of these there were parallels in the main period. For the nine mornings with an E to SSE wind, its mean speed at 900 metres above Norfolk was 20 knots, the same figure as for the big and moderate arrivals in Table IV. This makes it the more curious that the big and moderate arrivals in Table VI were associated with very light winds. When the figures used in Tables IV, VI and VII are combined, the average speed above Norfolk of winds between east and SSE was 17 knots for 22 big arrivals, 17 knots for 23 moderate arrivals, 12 knots for 25 small and very small ones and 12 knots for 34 negligible ones. Hence the average difference between big and negligible arrivals was only 5 knots, which might mean that the strength of the wind had no real influence, but more probably means that a strong south-easterly wind is only one of the possible factors resulting in big arrivals.

The arrival on 23rd October 1955 was the only big one recorded in this paper with a north-easterly wind throughout the North Sea. It was seen at all three observatories and, in addition to Goldcrests and Robins, it included many thrushes. It occurred with heavy frontal rain on the English east coast and this presumably precipitated many migrants that would otherwise, with the following wind, have proceeded inland without alighting.

During none of the twelve arrivals was fog recorded at either end of the North Sea and, in addition, most of the big ones took place at times when there was not total cloud. Total cloud was recorded at both ends of the North Sea for most of the moderate arrivals.

(*To be concluded*)

The past status of the Brent Goose

By G. L. Atkinson-Willes and G. V. T. Matthews

THIS PAPER CONCERNS the use of extracts from the British literature to obtain historical estimates of the numbers of the Dark-breasted and Pale-breasted Brent Geese (*Branta bernicla bernicla* and *hrota*). Salomonsen (1958) stated that "the number of Dark-breasted Brents wintering in Europe in the latter half of the 19th century must have amounted to about 216,000 birds. The total population, including both Pale- and Dark-breasted birds, now amounting to 26,500 birds, must have been 350,000 birds." The conclusion that there has been a catastrophic decline in the numbers of this species in

Europe during the present century has been sharply criticised in many quarters, especially by the Wildfowlers' Association of Great Britain and Ireland (W.A.G.B.I.). Salomonsen's calculations are based on his interpretation of a series of extracts from the British literature prepared by one of us (G.L.A.-W.) in 1953 for the Wildfowl Inquiry Committee, and passed to Salomonsen at the request of the Committee's successor, the International Wildfowl Research Bureau. Since we arrived at a different interpretation of these same data, and one with which the representatives of W.A.G.B.I. are in general agreement, it was felt to be worth publishing our conclusions in view of decisions that will have to be made on the protection of this species in the fairly near future.

Salomonsen's conclusion was reached by estimating the decrease in wintering populations "using figures for such (British) counties only in which average estimates are available for all three periods in question." The counties selected are not specified but inspection of Salomonsen's Table III and comparison with his summary in the text indicates that the figures used for the average sizes of the winter populations were:

	1875-1900	1920-1935	1948-1956
Moray	10,000	4,000	—
Northumberland	6,000	5,000	1,000
Hampshire	1,000	300	200
Clyde	1,000	500	—
Forth	500	300	—
Yorkshire	500	100	50
Dee, Tay, Durham, Kent	650	550	220
Dorset, Devon, Cornwall, Somerset, Lancashire	570	260	85
	20,220	11,010	1,555

He then states that "the recent population constitutes a small fraction—arithmetically a mere 7.66 per Cent—of that present 50-75 years ago. This heavy decrease no doubt holds good of all populations." Hence he assumes that the present European population of 26,500 is 7.66% of that in 1875-1900, which would thus have been 350,000.

Now, these "averages" are apparently derived either by taking the highest figure in a range as the average ("<500" for Yorkshire in Table III becomes an "average" of 500) or by halving it (250-12,000, 5-10,000, 0-2,000 for Northumberland in Table III become "averages" of 6,000, 5,000 and 1,000).

Moreover, it is quite wrong to assume that a decline in the goose population of one area is *necessarily* associated with similar declines over the whole range. Indeed many instances to the contrary could

be cited. It is particularly unfortunate that half the 1875-1900 sample is derived from Moray where the population may well have been finally driven away by bombing disturbance. Contrariwise, the sample excludes those areas (Wash and Essex) where more than two-thirds of our wintering Brent are *now* found. The sample is thus inevitably weighted towards producing an apparent radical diminution in the population.

But the fundamental error is to attempt to deduce *average* winter populations from historical data. Brent Geese are particularly prone to hard weather movements and are hence very erratic in their appearances. Even when regular counts are available, the average of figures ranging from 250 to 12,000 has no statistical value. The Northumberland data for 1875-1900 had just such a range, but while 12,000 was recorded twice no other year was credited with more than 1,000—except 1886 with 30,000. Salomonsen apparently overlooked the last figure; otherwise, if it had been introduced into his calculations, he would presumably have concluded that the 19th century European population was 500,000, instead of 350,000.

In the historical literature only the extremes in population fluctuations will have been recorded, a point stressed by Parish (1953). Moreover, the records will have value as a census only when the bulk of the population is concentrated in that part of the range which is covered by observers.

Early records from Ireland are so limited that no useful comparisons can be made, while the west coasts of Britain have never carried many Brent. Our south and east coasts are tolerably well served by county histories and other local publications and years marked by large influxes (those in which hard spells of winter weather have occurred) are unlikely to have escaped the records. In the hundred years before systematic wildfowl counts were attempted there are 17 such years. The counties in which influxes occurred are listed below. Since most references are mere collections of superlatives, only those giving some numerical basis are identified in detail. The full set of abstracts, covering some 150 titles, is deposited at the Wildfowl Trust.

1866/67 Moray
1870/71 Suffolk; Essex
1871/72 Suffolk; Essex; Devon
1877/78 Northumberland
1878/79 Northumberland (10-12,000, Chapman 1907); Durham; Suffolk; Essex; Sussex; Dorset
1880/81 Moray; Northumberland (10-12,000, Chapman 1907); Yorkshire; Norfolk
1885/86 Northumberland (30,000, Chapman 1889); Durham
1890/91 Moray; Yorkshire; Kent (many thousand, Ticehurst 1909); Hampshire; Devon; Cornwall

1895/96	Kent
1909/10	Moray (more than 2,000 shot, Berry 1939)
1911/12	Northumberland; Durham
1916/17	Northumberland (10,000, Chapman 1924); Yorkshire
1917/18	Northumberland (10,000, Chapman 1924)
1921/22	Northumberland (thousands, Chapman 1924)
1928/29	Forth; Yorkshire; Norfolk; Essex (thousands, Wentworth Day 1949); Hampshire; Dorset
1939/40	Kent
1946/47	Northumberland (5,000, G. W. Temperley *in litt.*); Norfolk (1,000, Wentworth Day 1949); Essex (15,000, Wentworth Day 1949); Hampshire (700, Luckham 1947)

Running through the literature is the repeated refrain that the large numbers present were unusual. Hawker's (1893) phrase "grand army" has been often quoted to suggest enormous numbers, but he (writing about an earlier period, 1802-1853) never saw more than 2,000 Brent in Hampshire and was able to use the very same expression in such a sentence as "The grand army of the geese had increased to 300". Another statement that has been given exaggerated interpretation is Chapman's "it was not uncommon to see 10-12,000 Brent in a single harbour." Often this is taken to mean that there were other harbours with similar numbers. But elsewhere Chapman writes "and this in a single harbour where there had not been over 4-500 geese all winter." He is clearly referring only to the harbour (Holy Island) with which he was familiar.

Descriptions such as "almost covering Findhorn Bay" (Harvie Brown 1895) or "sufficiently large to cover a ten acre field" (Russell, in Miller Christy 1890) can mean almost anything depending on the density of the flocks. Nor can much reliance be placed on Wentworth Day's estimate of 15,000 in 1947 since he writes (1949, p. 17) that this was "the biggest gathering I have ever seen in my life" and yet in the same book (p. 157) remarks that "I have seen as many as 25,000 gathered together . . ."

It is to Chapman that we must turn to obtain anything in the nature of reliable numerical estimates. His evidence, generally considered acceptable by wildfowlers and naturalists alike, is mainly confined to Holy Island, Northumberland. Here on 3rd March 1886 he saw "not less than 30,000" Brent Geese. That year the only other report of large numbers came from Durham and could well have referred to the passage of the same influx. In 1879 and 1881, when Chapman saw only 10-12,000 Brent at Holy Island, reports of unusual numbers came from respectively two and three quite distinct areas. So there is no evidence that there was any difference in the total influx. (The lack of other reports in 1917 and 1918 when Chapman again saw 10,000 may well have been due to war conditions.)

Since systematic wildfowl counts started in this country there have

been two hard winters. The late January and early February counts, covering all the Brent haunts, gave 7,000 in 1954 and 11,000 in 1956. As well as the cold weather influx these totals contain the birds normally overwintering here. This component was lacking in Chapman's 30,000 and, as we have already said, cannot be derived from the literature. But if some sort of figure must be put down, it is probably fair to say that in hard winters we are nowadays receiving something like a quarter of the Brent that would have arrived during the latter part of the 19th century.

This is a serious decline, but it is not the catastrophic collapse suggested by Salomonsen's figure of 7.66% (with its misleading claim of accuracy to one part in 10,000).

We would prefer not to attempt to extrapolate from these British data to any precise figure for the total 19th century European population of Brent. Apart from thereby having to assume that a similar decline took place over the whole area, we are by no means certain that a similar *proportion* of the European population came to Britain then as now. One of the impressions gained from the literature is that Light-bellied Brent made up the bulk of the big irregular influxes—to Moray, to Holy Island and even to Sussex—in the 19th century. The implication is that these birds, rather than the Dark-bellied, may have suffered the most severe decline. Nowadays we may expect to receive about half the European-bred birds, including all the Light-bellied birds from Denmark, in cold weather. If the same pattern was prevalent in the 19th century the influxes would have included more Light-bellied birds and therefore represented an even higher proportion of the European population, say as much as two-thirds.

It is in connection with the Spitsbergen population of Light-bellied Brent migrating up the Norwegian coast that Salomonsen brings out his only substantiation of the vast numbers he derives from his interpretation of the British data. Of a report by Holm he writes, "This may be an exaggeration, but even if we cut his figures down to five days with 50 flocks, each numbering on an average 100 birds, we get a total of 250,000 individuals." But $5 \times 50 \times 100 = 25{,}000$.

Finally, where could two-thirds of a 268,000 European-bred population have been accommodated in hard weather, on our south and east coasts (assuming 82,000 Light-bellied Brent from Greenland went to Ireland)? To cope with about 180,000 birds, not only Holy Island but also Moray, Essex and the Wash would have had to take 30,000 birds each, with groups of 10,000 each finding refuge in the Humber, in the Forth/Tay area, in Kent and in Hampshire; and all of this *simultaneously*. There is no trace in the literature of any such deluge in the 19th century.

Salomonsen's stated impression that shooting is the main cause of

decline may be correct, but the evidence is far from concrete. It is certainly unfortunate that he should have laid the main responsibility at the door of the British wildfowlers, because they were apparently the only people to record their activities during the 19th century.

While we have been critical of Salomonsen's handling of the historical records, we should, in fairness, point out that his discussion of these forms only part of a long paper in which useful light is thrown on the present day numbers, distribution and migrations of Brent Geese. These aspects have been reviewed at length by Boyd (1959).

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Notes

Attempted coition by Little Stints on autumn passage.—At Radipole Lake, Weymouth, Dorset, on 4th October 1957, I became very interested in the behaviour of two Little Stints (*Calidris minuta*). One was making short runs or low level flights across a shallow mud bank and then endeavouring to alight on the back of its companion, keeping up a distinctive trilling all the time. The other, by quickly turning sideways, would usually succeed in preventing this and then, in turn, with wings almost fully extended and head and neck thrust forward, would chase and drive away the first bird, also trilling as it did so. However, on three occasions during the fifteen minutes I spent watching them the one which I took to be a male managed to keep its balance on the back of the other, though I do not think coition actually took place. Mr. K. D. Smith informs me that he occasionally saw Little Stints courting in the early months of the year in Eritrea, the presumed males trilling and driving off other species from the females, but that he never witnessed any attempt at coition.

BERNARD KING

Great Spotted Cuckoo in Anglesey.—On 3rd April 1960 a Great Spotted Cuckoo (*Clamator glandarius*) was found at Pen-lon marsh, Newborough, Anglesey, by F. Walton, J. Walton, L. M. Walton, P. Walton, B. Stonebridge and myself. We watched it for two hours and were joined by L. S. V. Venables, U. M. Venables and C. F. Tunnicliffe. It remained in the area for at least twelve days, during which time it was seen by a very large number of observers. The last definite date we have for it is 15th April when it was seen by J. P. Wilkinson.

We first found it hopping around in drizzling rain on clumps of grass and on ridges in the marsh. The weather soon cleared and we got within 10 yards of it on several occasions; it was very approachable and made no effort to fly away, simply moving about by hops and small flights of several yards. It became alarmed only when the bells of a church near-by began to ring. We were able to note the following description:

> *Upper-parts:* crown light blue with dark lines; noticeable crest; nape very dark; back and rump dark. *Wings and tail:* wings dark sepia with pale markings on the coverts and three indefinite wing bars; tail dark and very long with white tips to most of the feathers and also white patches at the bases of the outer ones. *Sides of head and under-parts:* throat and sides of face yellow-white; dark patch running through eye; breast and belly off-white; under-tail coverts white. *Soft parts:* legs, bill and eye all dark.

Although the bird had a blue-grey crest, which it raised continuously, there was a good deal of rich chestnut in the wing in flight and so it was thought that it might be in first-summer plumage. When it did fly any distance its action was strong and direct and its general appearance was very reminiscent of that of a Cuckoo (*Cuculus canorus*). On 3rd April it was frequently seen to take worms, but on the 7th P. H. G. Wolstenholme and the Venables found it feeding voraciously on blackish caterpillars which it picked out of grass tufts; a short search then of one place where it had been feeding produced six caterpillars which were subsequently identified as those of the Drinker Moth.

G. F. WALTON

Redwings breeding in Ross-shire.—On 12th June 1960 I visited the locality in Ross-shire where at least two pairs of Redwings (*Turdus musicus*) had successfully nested in the previous year (*Brit. Birds*, 52: 315). Local people, who had become familiar with the birds in 1959, told me that several Redwings had been seen and heard singing during May 1960 and that one pair had hatched and reared a brood of young which had already flown. I was shown the nest which was in a rhododendron bush close to the house.

I then found a brood of five young Redwings in a nest about ten feet up in a creeper on the north side of the house. This may have been a second brood of the pair which nested in the rhododendron or it may have belonged to a different pair altogether. The nest was actually that of a Song Thrush (*T. philomelos*), to which some grass lining had been added. Both the adult Redwings were regularly seen feeding the young. I ringed the latter on 20th June and they flew on the 25th.

I also visited the actual breeding sites of 1959. The birch tree which had been occupied then again contained a Redwing's nest. It was a typical structure, newly built this year, and had obviously held young recently.

E. G. HOLT

Leg coloration of Reed Warblers.—The leg coloration of the Reed Warbler (*Acrocephalus scirpaceus*) is described in *The Handbook* as brown, and in *A Field Guide to the Birds of Britain and Europe* as dark brown. When trapping Reed Warblers at Fordingbridge, Hampshire, in July 1958, however, I was impressed by the number of those whose legs were tinged with shades of blue or grey and so I began to note down the colour in every bird. In all, a total of 21 (16 adults and five juveniles) was examined in this way between 12th and 15th July 1958. The following descriptions are necessarily subjective, but they do indicate that, at least at that time of the year, a large proportion of Reed Warblers have legs coloured differently from what is usually given in the reference books:

Adults

Horn with lavender tinge (2)	Brown with faint grey tinge
Greyish-blue with flesh tinge	Greyish-brown
Pale brown with greyish tinge	Dark greyish-brown
Pale brown with grey tinge	Pale grey
Pale brown with bluish tinge	Pale brown (3)
Pale brown with lavender tinge (2)	Dark flesh

Juveniles

Dull horn	Pale brown with slight grey tinge
Bluish-grey with flesh tinge	Pale lead-grey
Grey-blue	

Thus, unless the legs of this species change colour markedly with the season, it would be better to describe them as "flesh-coloured or brown, usually tinged with some shade of grey or blue". Incidentally, I looked at a number of Reed Warblers in the field at this time and in many cases bluish tinges were clearly visible through binoculars.

J. S. ASH

Reviews

The Bird in the Hand. By R. K. Cornwallis and A. E. Smith. British Trust for Ornithology, Oxford, 1960. 69 pages. 4s. (Obtainable from the B.T.O., 2 King Edward Street, Oxford, at 4s. 6d. including postage.)

At last the bird-ringer has available the type of guide for which he has been waiting. In my opinion this extremely reasonably priced booklet, published by the British Trust for Ornithology as Field Guide Number Six, will do as much to improve the standards of identification of the bird in the hand as the *Field Guide* has done to improve those in the field.

The booklet is divided into four parts, the first of which is headed "Handling". This deals with methods of holding birds for ringing and examination, with ways of extracting them from cage traps and nets, with keeping and releasing trapped birds, with the treatment of sick and injured ones and with the disposal of dead ones. The second is concerned with ringing, and contains sections on how to use metal and plastic rings and on the bird-ringer's position in relation to the law. Besides dealing adequately with all these subjects, the authors warn against the possible pitfalls and give much advice on correct procedure. If such a code of safety and good behaviour is maintained and continued by bird-ringers, they can have nothing to fear from outside criticism.

The third part contains valuable sections on the topography of a bird, the colours of plumage and soft parts, weighing, deparasitising, measuring, wing-formulae, moult and record-keeping. Necessary stress is laid on the importance of the standardisation of methods of recording this sort of information. In the section concerned with measuring it might have been pointed out that the measurement of the tail is always from or to the tip of the longest feather, and that of the tarsus from the angle at the *back* of the "knee" joint.

Many readers will find the cream at the bottom, in the fourth part. On 28 pages it deals with the important characters in sexing and ageing 54 species and one subspecies that are frequently handled by bird-ringers. This part is printed in a most accessible and readable manner, generously interleaved with blank pages for additional notes, and conveniently cross-referenced with the numbers from the *Check-list of the Birds of Great Britain and Ireland* and the relevant volume and page in *The Handbook of British Birds*. It is emphasised that this section is only a guide, and that there is still much to learn. This is true, of course, but nevertheless all ringers will find it invaluable for the determination of sex and age, and there will no longer be any excuse for

submitting ringing schedules with a long column of "f.g." on every page!

The few criticisms I have are only very minor ones. For instance, I had difficulty with the Kestrel key when trying to identify a skin, and I am sure from experience that it would have helped many ringers if it had been pointed out that summer-trapped adult female Chaffinches and House Sparrows are easily separated from juveniles by their abraded plumage. Also, anyone attempting to determine a single *alba* wagtail is going to meet with difficulty, and I feel that it would have been more helpful if this species had been treated in the form of a key with the characters to sex and age in the left-hand column.

Finally, I should like to say that if this publication sets the standard for the promised future guides on certain difficult genera, then these can be looked forward to with eager anticipation. No British—or for that matter European—bird-ringer or observatory worker can afford to be without it. J.S.A.

The House by the Shore. By Eric Ennion. Routledge and Kegan Paul, London, 1960. xv and 200 pages; 16 photographs and numerous black-and-white drawings. 28s.

This book, engagingly written and lavishly illustrated, tells how a country doctor and his wife founded the famous bird observatory at Monks' House, Northumberland, in 1950. But Eric Ennion was no ordinary general practitioner. Naturalist, artist and individualist, he had given up his practice in 1945 to start the pioneer Field Centre at Flatford Mill in Suffolk, and when this was triumphantly established he began to look for somewhere smaller, more suitable for migration studies, free from committee control and appealing to artists as well as to naturalists. After investigating many places in East Anglia and on the south coast, he heard by chance of a grey stone house on the Northumberland shore, close to the Farnes and Holy Island, and shortly afterwards the eighth of our bird observatories, a vital link in the coastal chain, was born.

Dr. Ennion describes the early struggles to furnish and equip it, the rewards and headaches of running an observatory, the wild life of the district and the many different types of people who come to watch and study. In perhaps the most valuable chapters in the book, he draws on a wealth of personal experience to discuss the practical problems to be met—the many kinds of traps used, their construction and operation, advantages and drawbacks; the handling and ringing of birds, the art of nest-finding and the care of the casualties brought in for attention. Though advice on these matters can be found elsewhere, here is a practical guide in one volume, illuminated by anecdotes

and generously illustrated with his delightful sketches. No enthusiast can fail to learn something from such a field expert.

At Monks' House the shore, with its constantly changing pattern of bird life and always the hope of a rarity appearing, is the main attraction, but there are many other fascinating places within reach, and the book concludes with accounts of these—Holy Island, the Farnes, the still unspoiled Cheviots, the Breamish valley where important ecological surveys have been made, and even forays across the Border to the Bass Rock. Dr. Ennion has clearly found the job which satisfies his diversely talented personality, and he communicates his delight most infectiously to the reader. S.C.

The Popular Handbook of Rarer British Birds. By P. A. D. Hollom. Witherby, London, 1960. xiv and 134 pages; 39 colour plates and one in black-and-white; text-figures. 37s. 6d.

This work is expressly complementary to *The Popular Handbook of British Birds* and deals with the birds which were adjudged too rare for inclusion in it, together with others whose first appearance is so recent that they were not then, and in some cases are not even now, admitted to the British list. The treatment of each species is similar to that in the original book, with an initial paragraph on field-characters, followed by short sections headed "Habitat", "General Habits", "Food" and "Status and Distribution". All the birds included are figured in colour.

Strictly within these limits, the work will be a most welcome addition to the library of every amateur ornithologist who will now have in two volumes a condensed account, almost completely up-to-date, of all the birds known to have occurred, not only in Great Britain but also in her sister island. (Several of the species covered are as yet unrecorded on this side of the Irish Sea.)

Perhaps a better title would have included the superlative term since most of the birds in the present work have occurred less than a dozen times. In a good number of cases, wherein identification calls for the comparative study of two closely related species, it will be necessary to refer to both "Popular Handbooks". It is fortunate that practically all the birds which have been admitted since the publication of *The Handbook* do not fall into this category, being well defined species of remote origin for whose recognition the present account will serve in some measure until the parent work is rewritten.

There is no doubt that we are at present enjoying an enhanced body of interest in bird-watching which is adding considerably to the numbers of sight records of the rare species. This has several consequences, not the least of which is the abrogation of the rule still applying in most other countries by which a species cannot be admitted

to the national list in the absence of an accredited specimen. This is not pre-eminently a humane requisite so much as an acknowledgement of the fact that practically all first sightings are now likely to be made by people with neither the wish nor the facility to collect them, in such circumstances as may leave no doubt as to the identity of the species concerned. It is obvious that this is a situation not without difficulty since for every hard and fast case there must be many when the degree of proof will need to be assessed and divested of any doubt before the record can be accepted. Fortunately the camera can be a vital aid. It is interesting to note that the only Western Sandpiper (*Calidris mauri*) was in fact first recorded as a Semi-palmated Sandpiper before what is now considered to be its true identity was recognised.

Those familiar with the literature will soon notice that a large number of early records of many species are no longer included. It has for many years been realised that a miasma of doubt hung around a morass of rarities which were alleged to have occurred in south-east England in the first two decades of the century and the author has wisely omitted all which derive from a particular source. In consequence, some species which had hitherto been supported by a specimen now find no place in the list while others are included because they have subsequently been seen or found dead in circumstances which vindicate their retention. Thus the Terek Sandpiper is now recorded as having occurred only thrice, every one subsequent to the publication of *The Handbook*. In most cases the degree of proof is entirely satisfactory, though I confess to misgivings with regard to the Brown Flycatcher; this now remains on the list by virtue of a single sight record, which it is my personal opinion would not have been found acceptable by a committee such as is at present responsible to this journal for the critical acceptance of records of rare birds.

I note that although the Rufous Warbler is alternatively styled the Rufous Bush Robin after Vaurie, the same author's assessments of racial validity are not always followed. For example, the race of the Arctic Warbler occurring in this country is more likely to be *Ph. borealis talovka* than the typical form.

The plates are reproduced from *The Handbook* except in those species which are new to the list. These are beautifully figured, all but one of them by D. M. Reid-Henry who contrives to make the maximum use of limited space and to posture his bird so that critical parts of its plumage are displayed to best effect; the last new painting is of the Baikal Teal by Peter Scott.

It becomes increasingly obvious that the avifaunal list of any area directly reflects the number of critical observers who sustain it and the greatest tribute one can pay to a work of this sort is to say that it will soon be out-of-date. I am sure that it will. A.H.

The Mystery of the Flamingos. By Leslie Brown. Country Life, London, 1959. 116 pages; 32 photographs and two maps. 25s.

This book should be compulsory reading for anyone who imagines that the age of adventure is dead in ornithology or that no major mysteries remain. It is as absorbing as a good detective story and, indeed, it was only by the use of the imagination, skill and doggedness of a sleuth that Leslie Brown reached his solution.

The mystery was the location in East Africa of the breeding places of *Phoenicopterus ruber* and *Phoeniconaias minor*, the Greater and Lesser Flamingos. The spectacle of "countless" numbers of these birds on the alkaline lakes of the Great Rift Valley in Kenya and Tanganyika has often been described by travellers and naturalists. It is likely that there are as many flamingos here as in the rest of the world put together; according to Mr. Brown the numbers are in the order of three million Lesser and at least fifty thousand Greater. Yet, despite these vast flocks and the relative accessibility of the lakes (the edge of the Rift Valley is only some twenty miles from Nairobi), practically nothing was known of the habits of the birds or even whether they bred in the Valley at all. There were a few old reports of the sighting of nests and eggs—Colonel Meinertzhagen had flamingo eggs for breakfast by Lake Nakuru in 1903—but flamingos are notoriously liable to desert and no one seemed to have clinched the matter by the discovery of downy young. European settlers who lived by the lakes had noted nests, but had never seen them used. The local tribesmen asserted that the birds did not lay eggs at all but produced their young far out in the water and that the young appeared only when they were fully grown and capable of flight.

This, briefly, was the state of knowledge of the breeding of flamingos in East Africa as late as 1953 when Leslie Brown, who was working in the Kenya Department of Agriculture, decided that the time had come to unravel the mystery. Ever since then, he has spent most of his leisure studying flamingos. Those who hoard the once-in-a-lifetime memory of a few thousand flamingos in the Camargue may well think with envy of the opportunity to enjoy, and study intensively, half a million or so every weekend. But conditions in the Rift Valley are no picnic: the ground temperature can reach 150° F., the valley floor is often rough volcanic rubble or fine dust, there is practically no water suitable for drinking and there are millions of malarial mosquitoes. Many of the lakes are largely crusted with crystalline soda interspersed with patches of foul and evil-smelling green algal fluid. Mr. Brown describes the difficulties, frustrations and dangers of the early days of his search modestly, without sensationalism but with a proper atmosphere of suspense, building up to the climax when

he first chartered an aeroplane and then learnt to fly himself in order to explore the more inaccessible regions.

It was from the air, in August 1954, that he discovered one of the main breeding grounds of the Lesser Flamingo, a colony of at least fifty thousand nests, at the tip of a vast tongue of soda mud in the middle of Lake Natron. Mirage made the colony invisible from the shore (and probably accounts for the tribal legend) but the indomitable Mr. Brown attempted to reach it on foot a few weeks later. He was defeated by the stinking, glutinous mud, nearly lost his life and suffered very severe burns from the soda crystals. Undeterred by weeks in hospital and skin grafts, he continued to explore the Rift Valley. In 1956 he discovered a colony of nearly five thousand pairs of Greater Flamingos on Lake Elmenteita, and in 1957/58 he established from the air that around 570,000 pairs of Lesser Flamingos were breeding on Lake Natron—by far the largest flamingo colony in the world.

The Mystery of the Flamingos is in the best tradition of ornithological literature (as distinct from writings about birds); besides the well-written account of the discovery of the colonies, it contains much completely new information on the feeding habits, moult and breeding biology of both species. It is well illustrated with Leslie Brown's own excellent photographs though, unfortunately, the lack of colour means that these fail to convey the extraordinary beauty of the birds and the setting. The outstanding film made by Mr. Brown gives a better impression, but the only way to visualise and enjoy the fantastic spectacle to the full is to accept Mr. Brown's advice to "go and see it for yourself; it is worth the air fare". E.R.P.

Letters

Migrations of the Oystercatcher

Sirs,—May I reply briefly to Mr. E. J. M. Buxton's recent letter (*Brit. Birds*, 53: 236-237) on the migrations of the Oystercatcher (*Haematopus ostralegus*)? It is a somewhat extravagantly worded communication, but I do not understand him to query the proposition that any proper study of Oystercatcher movements must take into account the fact that different breeding populations favour different winter quarters and consequently cover widely differing distances on their way there.

The only part of his letter that calls for further comment is, accordingly, the third paragraph. In this he criticises my treatment of the available evidence when I conclude that it does not support his suggestion that immature Oystercatchers move further away from their breeding areas than mature birds. His criticism is that one cannot say that a ringed bird recovered in December or January has

reached its "furthest south". This criticism conveniently ignores the only relevant ringing recoveries which unanimously suggest that, outside the breeding and migration seasons, Oystercatchers do not indulge in more than local movements:

Date and place of ringing		*Date and place of recovery*		*Miles*
21.9.52	Hilbre Is. (Cheshire)	13.3.53	Other side of Dee (Flint)	15
27.10.54	Isle of May (Fife)	12.4.55	Crail (Fife)	6
30.9.56	Shellness (Kent)	27.1.57	Shellness (Kent)	0
8.12.56	Conway (Caernarvon)	29.12.56	Deganwy (Caernarvon)	1
8.12.56	Conway (Caernarvon)	29.12.56	Llandudno (Caernarvon)	3

Curiously enough, Buxton specifically mentions the first two of these recoveries in his original paper (*Brit. Birds,* 50: 522). The recent Morocco recovery mentioned in his letter has, of course, nothing to do with the case. This bird could perfectly well have accomplished the trip very shortly after fledging, as witness the Fair Isle one that got as far as France in its first August. D. G. ANDREW

Grebes in Africa

Sirs,—I read in *British Birds* (53: 78) that the Black-necked Grebe (*Podiceps caspicus*) "is the only one of the five Palaearctic grebes to be found" in Africa. In the interests of accuracy it should perhaps be pointed out that both the Great Crested Grebe (*P. cristatus*) and the Little Grebe (*P. ruficollis*) also breed in Africa south of the Sahara.
M. F. M. MEIKLEJOHN

[This was an unfortunate error on my part. In self-defence I may perhaps be allowed to draw attention to the first paragraph of another text I wrote three years earlier (*Brit. Birds,* 50: 23).—I.J.F.-L.]

Recent reports and news

By I. J. Ferguson-Lees and Kenneth Williamson

The items here are largely unchecked reports, and must not be regarded as authenticated records. They are selected, on the present writers' judgment alone, from sources generally found to be reliable. Observers' names are usually omitted for reasons of space and in case a report is subsequently rejected, and none of the items will be mentioned in our annual Index. Readers are asked to submit anything of interest as quickly as possible.

This summary includes a few reports for the period from late April to early June, which were received too late for inclusion in either of the previous ones (pp. 278-280 and 316-320); it should therefore be read in conjunction with those. At the same time it continues the story for the second half of June and the first half of July.

THE RARER BIRDS

The most remarkable addition to be made to the list of spring vagrants is a Rufous Turtle Dove (*Streptopelia orientalis*) which was well seen at St. Agnes (Isles of Scilly) on 2nd, 3rd and 6th May; there are only two previous records of this Asian species in the British Isles. Three Great Reed Warblers (*Acrocephalus arundinaceus*) were mentioned last month and, of those, the Cornish bird remained until 7th June;

in addition, there was one near Thatcham (Berkshire) on 1st and 2nd June and another in Kent at the end of May. A Short-toed Lark (*Calandrella cinerea*) on Fair Isle in June has already been reported (p. 318) and we now learn that about that time, actually from the 8th to 16th, another frequented an area near the River Colne on Staines Moor (Middlesex). Gull-billed Terns (*Gelochelidon nilotica*) continued to be reported (*cf.* pp. 278 and 317): one was identified over flooded meadows near Deal (Kent) on 10th June and later the same day it or another was seen flying off the sea-front of the town; on 11th and 16th June one was noted at Reculver (Kent); on 2nd July there was one at Langney Point (Sussex); and on 3rd and 16th July Selsey Bill (Sussex) again entered the picture with one and two respectively, thus bringing to eight the number of observations there this year. Langney Point also produced the only new report of a Mediterranean Black-headed Gull (*Larus melanocephalus*), an immature on 16th June. There was a Roller (*Coracias garrulus*) near Acle (Norfolk) on 4th June and another a week later, on the 11th, between Snape and Orford (Suffolk). A Little Bustard (*Otis tetrax*) appeared in the same general part of Suffolk, at Orford Ness, on 20th June. A first-summer male Red-footed Falcon (*Falco vespertinus*) was watched closely, both in flight and perched, near Deal (Kent) on 6th July; observations of this species in Norfolk, Dorset and Hampshire in May were listed last month (p. 317). There was a male Red-headed Bunting (*Emberiza bruniceps*), as usual open to the suspicion of being an escape, near New Hartley (Northumberland) from 15th to 17th June. An adult Night Heron (*Nycticorax nycticorax*) was identified near Wroxham (Norfolk) on 12th June, and a White Stork (*Ciconia ciconia*) flying north over Fareham (Hampshire) on 13th.

Less rare species in parts of the country where they are not usually found included an Avocet (*Recurvirostra avosetta*) at Teesmouth (Co. Durham) for some days from 21st May (with a second bird on the 24th) and a Kentish Plover (*Charadrius alexandrinus*) between Minehead and Dunster (Somerset) on 8th July. A Red-necked Phalarope (*Phalaropus lobatus*) stayed for some time from 25th June on a village pond at Great Baldon, near Oxford. As usual, most reports of Spoonbills (*Platalea leucorodia*) were from the east and south-east coasts, but an adult was seen near West Huntspill (Somerset) on 25th June.

OUT-OF-SEASON WANDERERS AND THE RETURN MIGRATION

Northumberland was provided with two curious records of birds far south of their normal summer range by the appearance of a Little Auk (*Plautus alle*) in breeding plumage at Monks' House, Seahouses, on 26th June and of eight Whooper Swans (*Cygnus cygnus*) on the river at Cornhill-on-Tweed on 3rd July. Another unusual southward wanderer was a Swedish-ringed Black Guillemot (*Cepphus grylle*) which was found exhausted at Winterton (Norfolk) on 16th July. For twenty years Little Gulls (*Larus minutus*) have been regular autumn-to-spring residents on parts of the coasts of Angus and Fife (see, e.g., H. Boase, *Brit. Birds*, 47: 170-172), but this summer a number of first-year birds apparently stayed right through: 19 were seen on 6th June and 31 (with one full adult) on 2nd July. A late Firecrest (*Regulus ignicapillus*) was reported from Pembrokeshire last month (p. 318) and in this connection we should perhaps mention one at Dungeness (Kent) on 10th May. We should also like to take this opportunity of correcting an erroneous reference in our last summary to Lapland Buntings (*Calcarius lapponicus*) at Spurn (Yorkshire) on three days in May (p. 320): this entry was the result of a mistake in transcription and the three dates actually referred to Marsh Harriers (*Circus aeruginosus*)!

From a number of areas in different parts of the country there came reports of a return passage of waders, and also of terns and ducks, from the second half of June onwards. Most of these concerned the east coast from south-east Scotland down to Kent, but there were also observations from the west and inland. The first reports came during 17th-19th June and the movement seems to have gathered

momentum in the last week, particularly from about the 26th. The waders involved included Green Sandpipers (*Tringa ochropus*), a few Wood Sandpipers (*T. glareola*), odd Spotted Redshanks (*T. erythropus*) and Greenshanks (*T. nebularia*), a number of Ruffs (*Philomachus pugnax*) and even one or two Little Stints (*Calidris minuta*), as well as commoner species. A Spotted Redshank near Margam Abbey (Glamorgan) is perhaps worth singling out as this species is rare in south Wales. These late June waders are not, of course, so very unusual, but the reports this year seem to have been rather earlier and more widespread. A large-scale movement of Lapwings (*Vanellus vanellus*) was also noted by a number of observers in Kent, Surrey, Middlesex and Buckinghamshire in the second half of June, again particularly around the 26th; the general heading was north-west or WNW. Among other interesting observations of birds on the move at this same time was an Arctic Skua (*Stercorarius parasiticus*) inland at Hurworth Burn Reservoir (Co. Durham) on 26th June; skua passage was reported on the east coast at that period.

HOOPOES AND BLACK TERNS

Reports of Hoopoes (*Upupa epops*) continue to come in for May and June. It seems clear that there was a good, though not exceptional, passage of these birds this spring, but that the number of stragglers to the northern half of the country was quite remarkable. Last month we mentioned observations in Co. Donegal, Derbyshire, Nottinghamshire, Lancashire, Yorkshire and Northumberland, mostly in the first three weeks of May. We have now heard that there were some seven reports at least from Scotland in the same period. Among these were single birds at Dirleton (East Lothian) on 2nd May, near Dunblane (Perthshire) on the 15th, at Elie (Fife) on the 16th, at Riccarton Junction (Roxburghshire) on the 17th and on the Isle of Arran (Bute) on the 22nd; there were also as yet unconfirmed reports of three at Denholm (Roxburghshire) from early May to at least the 12th and one at Gordonstoun (Moray) shortly before the 18th. Two at Cranford Park (Middlesex) on 21st June represent the latest observation we have of more than one bird.

Black Terns (*Chlidonias niger*) were seen in odd ones and twos throughout June and early July following the big influx in May (pp. 316-317). A somewhat northerly record among these was one at the Farne Islands (Northumberland) on 16th June. We should add here, however, that we are now told that there was one in Scotland (where the species is seldom recorded in spring) in the middle of May just after the peak of the movement further south: this was at Peppermill Dam (Fife) on the 15th.

SWIFTS AND COLLARED DOVES

Early Swifts (*Apus apus*) this year have been mentioned in each of our previous two summaries (pp. 279 and 320), but we think it worth referring to them yet again to complete the picture of first arrivals. One at Luton (Bedfordshire) on 19th April should be added to the extreme dates and we have also had a number of April records from Scotland, apart from the Perthshire one mentioned last month: on the 26th there was one at Carter Bar (Roxburghshire) and six in Clackmannanshire; on the 28th the species was noted at Duddingston, Edinburgh; and on the 29th two were seen at Bonnybridge (Stirlingshire) and the first arrivals appeared in Fife.

Finally, the Collared Dove (*Streptopelia decaocto*). We pointed out in the June number (p. 280) that there were signs of a new push by this bird and reports received since then confirm this. At least one new breeding site has been discovered, more stragglers have been noted at places like Fair Isle—including one at Stornoway in the Isle of Lewis (Outer Hebrides) on 2nd June—and a considerable increase is reported from some of the established breeding areas. At one town in Kent, for example, gatherings of up to 47 were seen at a poultry farm in July. It is therefore well worth keeping a special watch for this species now and we hope that new records will be reported to us as soon as possible.

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